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Waste minimization, household hazardous waste, and a model curriculum guide for regional occupational programs for the County of Riverside Department of Health Environmental Health Services

Michael Ray Shetler

WASTE MINIMIZATION, HOUSEHOLD HAZARDOUS WASTE, AND A MODEL CURRICULUM GUIDE FOR REGIONAL OCCUPATIONAL PROGRAMS FOR THE COUNTY OF RIVERSIDE DEPARTMENT OF HEALTH ENVIRONMENTAL HEALTH SERVICES

A Culminating Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Special Major

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by
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ABSTRACT

This paper is a compilation of educational information and provides the basic structure for administering a hazardous waste minimization program consisting of three component parts;

1. Waste minimization and pollution prevention
2. Household hazardous waste collection
3. Educational lesson plans for providing environmental information to Regional Occupational Programs.

Each component part is esential to an integrated hazardous waste management plan which will provide the citizens of Riverside County environmentally safe alternatives to hazardous materials management for the future.

Acknowledgements

I would like to thank the following people in my endeavor to complete this project. Thank you to my wife Pam and daughters Jennifer and Kristin who put up with me and my constant mess at the computer and the disruption of our lives. Many thanks to Dr. Thomas C. Timmreck, you have been an inspiration. To Mr. John Fanning, Director of Environmental Health Services for the County of Riverside for your help and support. To Mr. Jon Kindchey, a friend and mentor. And finally, to my staff of hard working individuals who have helped to make my job a little easier; Mrs. Joanne Glenn, Mr. Craig Brackbill, Mr. Mike Daly, and Mrs. Joy Wehunt.

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CHAPTER 1

INTRODUCTION

This report is a culmination of research, analysis, and an evaluation of growing volumes of information regarding pollution prevention, hazardous waste minimization and household hazardous waste collection programs. A model curriculum program to be used by Regional Occupational Programs is included. This report offers practical recommendations and considerations for hazardous waste issues that are attracting increased public attention nationwide.

The fundamental hypothesis is that pollution prevention and waste minimization should be considered essential elements of every hazardous materials management plan. In addition, local governments must form a partnership with industry and become actively involved in the promotion of pollution prevention and waste minimization to ensure effective implementation.

Other essential elements to the hazardous materials management plan include the incorporation of a community-wide "Household Hazardous Waste Collection Program", which will help to divert household hazardous wastes from solid waste disposal sites, and promote recycling. Another component is an aggressive educational campaign that focuses on students in regional occupational programs (ROP). ROP's are trade oriented outreach programs for students who have problems succeeding in the traditional classroom setting. This model curriculum program will ensure that these ROP students will receive fundamental training in the areas of pollution prevention, waste minimization, and the proper handling of hazardous materials and wastes in the work-place.

The second chapter of this report provides a review of background information about pollution prevention and waste minimization, and briefly describe the reasons for the necessity and emphasis. Also included, is a description of the current regulatory requirements and legislation at both the state and national levels, as well as the incentives and barriers associated with implementation of pollution prevention and waste minimization measures.

Chapter three summarizes the findings of an in-depth analysis of literature describing what is actually being done to promote hazardous waste minimization in one of the nation's largest waste producing industries, the organic chemical industry. A description of the current situation in the organic chemical industry, with examples of various waste minimization and pollution prevention techniques and their results will be discussed.

Chapter four highlights hazardous waste issues in Riverside County, and provides a limited characterization of local waste streams, (A waste stream is the source of a waste material and the process involved which would render the materials a waste), with a rough projection for the future.

The fifth chapter discusses the specific actions the County of Riverside has taken to implement a local pollution prevention and waste minimization program. The basic parts of a local program are described as follows: an assessment of pollution prevention and waste minimization potential, education of the community, and an approach to minimize

the volume and/or toxicity of hazardous wastes generated by industries in the County of Riverside.

Basic groundwork for the program design, framework, and implementation sequence has been established in this report. However, it is not necessary that the program be defined before it advances from the planning to the action phase. The Environmental Defense Fund, in their publication, Approaches To Source Reduction of Hazardous Waste, addresses the question of when to move from the study to the implementation phase with the following comments:

> "Because data needs are primary, and because so much detail is potentially relevant to the implementation of a source reduction program; there is a temptation to make ambitious study plans and then await the complete results -- perhaps for several years -- before taking further steps, Some state programs have been able to move relatively quickly to implementation, in defined subcategories of the waste problem, without waiting for information to be complete; and this incremental approach appears to be the key to success. A well designed source reduction program will also contain a mechanisim to generate its own information on the basis of early program experience."[1]

Why Pollution Prevention and Waste Minimization?

The reason for pollution prevention and waste minimization programs is best described in a policy document from the Local Government Commission:

> "The Chemical contamination of our environ continues to worsen because greater amounts of hazardous waste continues to be produced and accumulated. Hazardous waste "cleanups" often means that dangerous chemicals are being transferred from one place or one medium to another. We dispose of wastes by putting them into landfills, but the groundwater and soil below become contaminated. We aerate contaminated soil and groundwater only to find the pollutant now in the air. We discharge wastewater containing toxic chemicals into sewers where it eventually makes its way to creeks, rivers, and bays. There is only one solution . That is to reduce

the amount of hazardous waste we produce, preferably at the very source." [2]

At the national level, the Hazardous and Solid Waste Amendments (HSWA) of 1984,(Public Law 98-616), set a clear direction with respect to the minimization of hazardous waste with the adoption of the following:

> "The Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment."[3]

In California, the State Department of Health Services, (DOHS), has established a land disposal phase out program which not only discourages the landfilling of recyclable hazardous wastes, but also prohibits, over the next few years, the land disposal of various other hazardous wastes. California's lead has inspired some twenty states to adopt hazardous waste reduction programs, as well as, countless local programs throughout the country.

As a nation which annually pumps billions of dollars into hazardous waste management efforts, we are finally coming to the realization that there has to be a safer and more permanent solution to our hazardous waste problems. The solution seems simple enough, generate less hazardous waste. In practice however, our ever increasing need for consumer goods and our absolute reliance on chemicals to manufacture those goods, make that simple solution somewhat difficult to apply. Overcoming that difficulty will take the concerted

effort of both industry and government, (the responsibility does not rest with industry alone). Government (at all levels) must be willing to work cooperatively with industry by lending financial, technical, and legislative support.

Ventura County's highly successful hazardous waste reduction program is a good example of how industry and government worked together to develop a model program. Fifty percent of the 75 major generators in Ventura County have found alternatives to land disposal of their wastes. Hazardous waste generation for the County of Ventura was down 40% in 1986 from 1985, and as of 1989 the generation of hazardous waste was down, as much as, 70%. Further waste minimization is expected as the remaining generators, (generator is a term used to define those businesses that accumulate hazardous waste in the course of manufacturing a product), institute appropriate waste reduction techniques.

One often heard argument against waste reduction is that the initial implementation costs (start-up money for new processes and equipment) are prohibitive; and until recently it probably was cheaper to just landfill the wastes. However, in today's society industry is faced with high transportation and land disposal fees, sky rocketing environmental liability insurance and the inevitable ban on land-filling of all untreated hazardous wastes in California; all of which are strong incentives for reducing or eliminating the generation of hazardous wastes. In fact, in many instances where companies have taken the initiative to

an in-house waste reduction program, substantial savings of time and money have been realized with resultant benefits far exceeding any up-front costs.

Chapter six will include a discussion of the household hazardous waste community collection program.

Chapter seven will discuss the model education component. There are extreme costs and barriers that must be addressed and include up-front start up costs, advertising, manpower management, material costs, storage costs, transportation and disposal fees, publication costs, and lack of public awareness for each of these components.

The final chapter includes comments regarding the state of the environment. A glossary of terms, and an appendix which includes a program budget, educational literature developed for specific industries, and forms used by the household hazardous waste collection program are attached.

DEFINITION OF TERMS

There seems to be some disagreement over the precise meaning of terms relevant to pollution prevention and hazardous waste minimization. Therefore, in order to avoid any misunderstanding, and to remain consistent with the Environmental Protection Agency (EPA) and the State of California Department of Health Services (DOHS) the following definitions are presented.

WASTE MINIMIZATION (used interchangeably with waste reduction): "Waste minimization means the reduction, to the extent feasible, of hazardous waste that is generated or subsequently treated, stored, or disposed of. It includes any source reduction or recycling activity undertaken by a generator of hazardous waste that results in either (1) the reduction of total volume or quantity of hazardous waste, (2) the reduction of toxicity of hazardous waste, or both, so long as the reduction is consistent with the goal of minimizing present and future threats to human health and the environment."[4]

In the broadest sense, the Hazardous and Solid Waste Act (HSWA, Public Law 98-616) defines waste minimization as, "any action taken to reduce the volume or toxicity of wastes."[5] That definition includes the concept of waste treatment, which encompasses such technologies as incineration, and chemical detoxification.

The United States Congressional Office of Technology Assessment (OTA) adopted a more stringent definition of waste minimization. They argued that by including treatment in the definition, waste generators are given a "green light" to pursue waste management practices in the name of waste reduction (see Figure 1). As a result, OTA's definition of waste reduction is as follows:

> "Waste reduction refers to in-plant practices that reduce, avoid, or eliminate the generation of hazardous waste so as to reduce risks to health and the environment."[6]

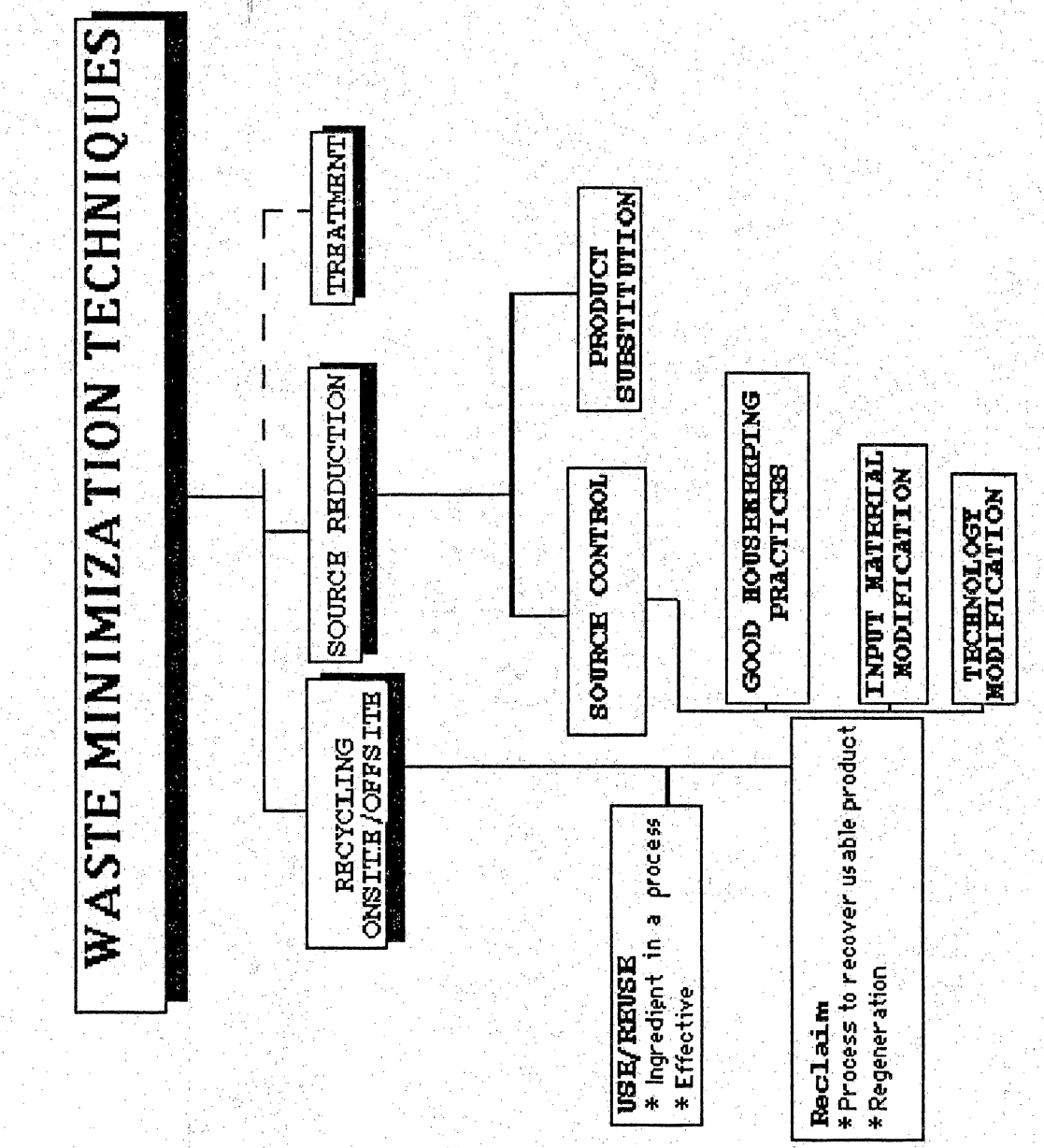
RECYCLING/REUSE:

Refers to the use or reuse of a waste as an effective substitute for a commercial product, or as an ingredient or feedstock in an industrial process. It also refers to the reclamation of useful constituent fractions within a waste material or removal of contaminants from a waste to allow it to be reused. As used in this report, recycling implies use, reuse, or reclamation of a waste either on-site or off-site after it is generated by a particular process.

SOURCE REDUCTION:

Any activity that reduces or eliminates the generation of hazardous waste within a process. Source reduction is generally taken to mean not producing the waste in the first place. Hazardous waste "prevention" is preferred over waste "management" in which there will always be some environmental risk and regulation required. The potential for waste minimization and pollution prevention can be identified by

Figure 1



Source:

U.S. Office of Solid Waste, Environmental Protection Agency, Report to Congress: Minimization of Hazardous Waste, 2 Vols., Washington, D.C.: U.S. Department of Commerce, National Technical Information Service, Oct. 1986, I: iii, Figure 1.

by examining how and why each waste is produced. This question can be best answered by individual generators, since waste generation and reduction is site and process specific.

Examples of Source Reduction Methods:

Chemical Substitution

Spill Prevention

Housekeeping

Inventory Control

Segregation

Source Reduction is defined in the California Hazardous Waste Source Reduction and Management Act of 1989 (Senate Bill 14) as one of the following:

"(A) Any action which causes a net reduction in the generation of hazardous waste;

(B) Any Action taken before the hazardous waste is generated that results in the lessening of the properties which cause it to be classified as a hazardous waste."[7]

TREATMENT:

Refers to partial or total elimination of the hazardous characteristics or volumes of a waste stream. Through the use of various processes or techniques the wastes are destroyed or degraded to yield less toxic residuals, which when discharged, pose a lower risk to the public and the environment. After examination of waste minimization,

pollution prevention and recycling potential, hazardous waste treatment may be necessary. Treatment, however, must not be given the same priority as source reduction and recycling. It should be considered a "last resort" alternative, next to land disposal in the preferred hierarchy.

Examples of Treatment Methods:

Neutralization
Precipitation
Evaporation
Incineration
Filtration
Ion Exchange

Waste Minimization Audit:

A survey conducted by in-plant personnel or consultants which identifies and evaluates opportunities to reduce hazardous waste generation. This can be accomplished by utilizing the E.P.A.'s Waste Minimization Opportunity Assessment Manual, which provides a no-nonsense approach to performing a waste minimization audit.

CHAPTER 2

BACKGROUND

The Resources Conservation and Recovery Act of 1976 (RCRA, 42 United States Code, Section 6901-6987),[8] and the Hazardous and Solid Waste Amendments of 1984 (HSWA, Public Law 98-616)[5] were enacted because of concerns over the Environmental Protection Agency's inability to develop a comprehensive hazardous waste management system. Prior to this period, environmental protection efforts focused on control and cleanup of pollution rather than pollution prevention and waste minimization.

As the costs of regulatory compliance and the administration of environmental programs escalate, the economic and environmental benefits of minimizing hazardous waste at its source becomes more compelling. Therefore, pollution prevention and waste minimization can be viewed as a means of reducing liability, increasing profitability and competitiveness, and providing for a reduction of deleterious hazardous substances into the air, water, and soil.

Unfortunately, in our consumer oriented society there are many products that cannot be made without the generation of hazardous wastes. Consequently, the need for land disposal capacity may never reach the desired goal of zero.

The national debate on environmental issues is moving away from discussion over traditional pollution control measures to a more basic proposition: how can pollution prevention and waste minimization be used to enhance pollution control?

The case for pollution prevention and waste minimization is best articulated by Dr. Joseph T Ling of the 3M Company:

> "Pollution controls solve no problem; they only alter the problem, shifting it from one form to another, contrary to this immutable law of nature: the form of matter can be changed, but does not disappear... [I]t is apparent that conventional controls, at some point, create more pollution than they remove and consume resources out of proportion to the benefits derived... What emerges is an environmental paradox. It takes resources to remove pollution; pollution removal generates residues; it takes more resources to dispose of this residue and disposal of residue also produces pollution"[9]

The concept of minimization vs. management is not meant to be complicated or confusing. It is used here simply to express the preferred priority of hazardous waste management techniques (refer to Table 1). The treatment processes may satisfy the need to reduce toxicity and/or volume, but the end result remains, disposal of a material that cannot be treated further. The use of a treatment process should only occur after a thorough examination of the available source reduction and recycling options. When the decision must be made, the key question that needs answering is "Why is this waste present?" The primary cause must be indentified before attempting a solution.

Once the question of cause has been determined, the next step would be to generate a comprehensive set of waste minimization options following the previously listed hierarchy found in Table 1. An important consideration to remember is, will the reduction of the hazardous waste transfer the

TABLE 1
PREFERRED HIERARCHY OF WASTE MANAGEMENT ACTIVITIES[1]

Product Substitution

(shift to product that results in lower hazardous waste out-put)

Input Substitution

(shift to less toxic in-put or results in lower hazardous waste out-put from same product)

Process Modification

(lower hazardous waste out-put from same product and same type of in-puts)

-- redesign -- improved "housekeeping"

Recovery & Reuse (on-site)

(lower net out-put of waste material)

Recycling & Reuses (off-site)

-- shared central facilities -- waste exchange

-- third party recyclers

Treatment

-- neutralization -- incineration

-- evaporation("dewatering") -- stabilization

Disposal

-- residuals repositories -- deep well injection

-- surface impoundments -- ocean dumping

-- landfills

Source:
Environmental Defense Fund, "Approaches to Source Reduction of Hazardous Waste: Practical Guideline from Exisiting Policies and Programs, California Institute of Public Affairs, 1986, p. 8, Figure 1.

problem to another environmental medium? Environmental medium transfer is a term that refers to the change in physical state of the waste. An example would be the evaporation of a solvent (liqiud to gas) such that the vapors are released into the atmosphere. This technique does not constitute waste minimization or pollution prevention.

CURRENT WASTE MINIMIZATION REQUIREMENTS

Recognizing the failure of past land disposal practices, as well as concerns with the preservation of public health and the environment, both federal and state government have passed legislation which recognizes the need for pollution prevention and waste minimization as integral components to an integrated waste management plan.

Presently, at the federal level, this consensus is expressed in three formal statutory requirements, all of which were enacted as part of the 1984 amendments to the Resource Conservation and Recovery Act (1976).[5,7]

1. Section 3002(b) of HSWA[5] requires generators to certify on their waste manifests that they have in place a program "to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable.

2. Section 3005(h) of HSWA[5] requires the same certification in relation to any new permit issued for treatment, storage, or disposal of hazardous waste.

3. Section 3002(a)(6) of HSWA[5] requires, as part of any generator's biennial report to EPA, that the generator describe "the efforts undertaken during the year to reduce the volume and toxicity of waste generated, as well as changes in volume and toxicity of waste actually achieved during the year in question in comparison with previous years, to the extent such information is available for years prior to enactment of [HSWA]."[3]

These amendments, in effect, require industry to implement alternatives to land disposal. This legislation should increase the awareness of generators of hazardous waste, facility owners, and industrial operators, of the importance of minimizing hazardous wastes. However, the present requirements are not restrictive. The requiremnts allow the generator of hazardous waste to determine whether a particular waste minimization technique is economically feasible or not. Unfortunately, this type of approach will not solve the problem. More specific and extensive resarch and technological breakthroughs must be investigated to help enhance the potential for waste minimization and pollution prevention. Technology transfer is an integral component to solving the complex hazardous waste problem, not restrictive regulations.

The 1984 RCRA amendments also create a national land disposal restriction program using California's successful program as a model. The wastes now banned in California are

among those to be banned under the federal program. Also under federal law, the hazardous waste generators are subject to joint and severable liability for the hazardous wastes they produce, even after those wastes are disposed of in "approved" landfills.

In addition to the federal regulations, California has initiated a hazardous waste program that has led the nation. California's waste hauler manifest program was used as the model for the RCRA "cradle-to-grave" hazardous waste tracking system. Furthermore, California's land disposal phase-out program was the first in the nation and has already led to the elimination of land disposal of several separate categories of waste. These along with recycling regulations and waste reduction efforts promote safe handling of hazardous waste.

Table 2
List of Recyclable Wastes 11

California Waste Code	Waste Type
211	Halogenated Solvents
212	Oxygenated Solvents
213	Hydrocarbon Solvents
214	Unspecified Solvents
221	Waste Oils
512	Empty Containers
111	unspent Acids
123	unspent Alkalis

Source:
Ventura County, California, Environmental Health Department, Hazardous Waste Reduction Guidelines for Environmental Health Programs, Sacramento, California Department of Health Services, May 1987, p. 4, Table I-a.

California law, Title 22 of the California Code of Regulations, beginning with Article 12 Section 66763, discourages the landfilling of wastes that are considered to be recyclable, and therefore subject to regulation.[10] These recyclable wastes are listed in Table 2.

Table 3

Land Disposal Phase Out Schedule [11, 12]

Effective Date		Waste Types
January 1, 1985	-	1. Free Cyanides (1000ppm)
		2. Toxic metal wastes:
		- Arsenic (500ppm)
		- Cadmium (100ppm)
		- Chromium VI (500ppm)
		- Lead (500ppm)
		- Mercury (20ppm)
		- Nickle (134ppm)
		- Selenium (100ppm)
		- Thallium (130ppm)
		3. Polychlorinated Biphenyls (PBC's) (50ppm)
		4. Acid Wastes (ph < 2.0)
		5. Caustic Wastes (ph >12.5)
January 1, 1985 (1000ppm)	-	Liquid wastes containing Halogenated organics
May 8, 1985	-	Bulk hazardous liquid wastes (RCRA mandate)

Table 3 (continued):

January 1, 1986	- Prohibits use of surface impoundment for treatment of restricted wastes unless provided by Department variance (Toxic Pits Cleanup Act - AB 3566, 1984)
November8, 1986	- EPA expansion of program banning spent or discarded solvents in accordance with HSWA of 1984
July 8, 1987	- Organic sludges and solids containing halogenated compounds (1000ppm)
January 1, 1988	- Prohibits disposal of hazardous wastes having a heating value of 3000 BTU's per pound. (Health & Safety Code 25155.5)
June 30, 1988	- Prohibits discharge of any liquid wastes into surface impoundments (Health & Safety Code 25208.4)
May 8, 1990	- Prohibits disposal of liquid hazardous wastes in landfill and prohibits the land disposal of untreated

Table 3 (continued)

		disposal of all untreated wastes. Hazardous Waste Management Act, 1986. (Health & Safety Code, Chapter 6.5, Section 25179.1)
June 1, 1990	-	1. Prohibits disposal of liquid hazardous waste in landfills (Health & Safety Code, Section 25200.2(b)).
		2. Prohibits disposal of untreated hazardous waste into landfills (Health Safety Code Section 25200.2(c)).

Sources:
Ventura County, California, Environmental Health Department, Hazardous Waste Reduction Guidelines for Environmental Health Programs, Sacramento, California, Department of Health Services, May 1986, pp. 4-6, Table I-6; and California Department of Health Services, Toxic Substance Control Division, Alternative Technology and Policy Development Section, Alternative Technology for Recycling and Treatment of Hazardous Waste: Third Biennial Report, Sacramento, California, July 1986, pp.181-186.

Finally, Assembly Bill 2948,(Tanner, Health & Safety Code Article 3.5, Section 25135 et. seq.) established local programs and procedures to aid in the location and permitting

of hazardous waste facilities). The bill enables local governments to prepare hazardous waste management plans. The plans are to include:

1. Analysis of the waste stream.
2. Description of existing hazardous waste TSD facilities.
3. Analysis of the potential for recycling and reducing hazardous waste.
4. Household hazardous waste management programs.
5. Determination of the need to site a TSD facility.
6. Description of existing programs.
7. Developing local policies to address hazardous waste issues.

The Tanner bill also prohibits the disposal of hazardous liquids in landfills as of January 1, 1987 and prohibits the disposal of untreated hazardous waste after January 1, 1990. (This prohibition has been pushed forward to January 1, 1991) It requires full examination of the potential for hazardous waste reduction prior to the decision that a storage, treatment, or disposal (TSD) facility is necessary. If possible, the Tanner Process will require waste minimization and pollution prevention in lieu of siting a TSD facility.

The reporting requirements aspect of California's regulatory program has been modified to be consistent with federal requirements. Therefore, generators of hazardous waste must submit a biennial report to the State Department of Health Services (DOHS).

This report details the type and quantities of hazardous waste shipped off-site by the generators of hazardous waste, as well as documentation of waste reduction efforts and changes in generation from the previous year. Operators of treatment, storage, and disposal facilities must also submit a similar report. Finally, as under federal law, industries that generate hazardous waste and send wastes off-site must certify on their manifests that they are pursuing waste minimization.

Aside from the regulatory portion, California's hazardous waste program is made up of three additional parts: technical assistance, information/technology transfer, and economic incentives. The technical assistance component is designed to address specific needs of companies and/or industries. The Department of Health Services (DOHS) is involved in the development of generic wastestream specific studies, operation of the California Waste Exchange, generic waste reduction audits, and direct technical assistance. DOHS staff are also providing grant funding for joint studies with industry associations, and also, are maintaining a Technical Reference Center which includes an extensive collection of information on waste reduction and alternative treatment technologies.

A second additional component of the program is information and technology transfer. While each part of the program is important, information and technology transfer component is perhaps the most important. If industry is not

aware of the regulations, the opportunities and the incentives for waste reduction, they will not actively seek alternatives to the use of land disposal. The objective of this program element is to inform industry of the advantages of waste minimization and provide information resulting from other components of the program. The dissemination of this information is accomplished through seminars, fact sheets, reports, newsletters, and catalogs. Also, under the provisions of the Health and Safety Code, Section 25171, the DOHS is required to prepare a comprehensive report on waste reduction, recycling, and treatment technologies.[7]

The final component, economic incentives, consists of both positive and negative motivators. The positive incentives, meant to encourage minimization, include grants, loan guarantees, and loans to generators to enable them to overcome financial barriers. On the other hand, the negative incentives, in the form of fees and taxes, are used to make land disposal less attractive to industry.

This State program was developed due to the actual and perceived hazards of land disposal. This, in turn has led to the closure of many hazardous waste disposal sites, thus substantially limiting the capacity of off-site disposal in California. It may be that in the near future commercial land disposal capacity will be available only for the residual wastes of treatment processes. Furthermore, hazardous waste generators recognize that they may be held

liable for any contamination caused by their wastes many years into the future. Therefore, because of the limited disposal capacity and the threat of "ultimate liability," the need for alternatives to land disposal, such as waste minimization, have never been greater.

INCENTIVES AND BARRIERS

Today's established regulatory requirements provide indirect economic incentives to encourage waste minimization in the private sector. However, these requirements are only meant to encourage voluntary actions, leaving the final choices between processes, the degree of compliance and the definition of "economically practicable" solely to the generator. As a result, it is not certain that these regulations are strong enough incentives for all generators of hazardous waste. This does not necessarily mean that government must prescribe and regulate the amounts of waste minimization hazardous waste generators must accomplish. Instead, government should concentrate on informing generators of hazardous waste on all of the incentives, while considering the barriers to waste minimization.

Incentives For Waste Minimization

1. Dramatic Increases in the Costs of All Forms of Hazardous Waste Management: Federal and State regulations have been the primary causes of the increased costs in treatment, storage, and disposal of hazardous waste. This is

especially true with respect to landfills, surface impoundments, and storage and accumulation tanks. As the land disposal restrictions increase, the costs associated with it will also increase. Also, as more stringent standards on surface impoundments are enforced, capacity will decline due to closure of approximately half of those sites now in existence. In addition, the recent hazardous waste storage tank rules which increase the standard safeguards, will also raise costs. Therefore, generators of hazardous waste will have to find alternatives for treating, storing, or disposing of their wastes.

As generators of hazardous waste seek alternatives, such as incineration or chemical detoxification, there will be greater competition for scarce treatment capacity, again increasing the costs. These increasing costs of waste management provide a strong incentive for generators of hazardous waste to minimize their wastes through either the use of waste minimization, pollution prevention, or recycling techniques.

2. Difficulties in Choosing Acceptable Sites for Hazardous Waste Treatment, Storage, and Disposal: Increasing restrictions on landfill capacity, and new strict hazardous waste disposal site criteria has caused a growing demand for new TSD facilities. Hazardous waste managers are therefore seeking new sites and planning expansion projects at existing facilities. However, the public response is, "Not in my

community!" This intense opposition is extremely hard to overcome and may cause shortages in treatment capacity to continue even when demand is strong. In many cases the only alternative for generators of hazardous waste may be to rely on source reduction or on-site recycling to reduce the quantity of waste that would otherwise be sent off-site.

3. Permitting Burdens and Corrective Action Requirements: Even though the demand for new treatment and disposal capacity will be high, the permitting process will tend to delay availability of the new capacity, driving up the costs of all forms of treatment and disposal. New facilities cannot be constructed until the appropriate permit is acquired. This process usually takes several years to complete. Also, permits after November 8, 1984, require corrective action for releases of hazardous waste, regardless of when it was placed, both within and beyond property boundaries. This potentially expensive requirement applies to all facilities, providing still another incentive for generators to reduce the amounts of hazardous waste through the use of source reduction and onsite/offsite recycling techniques.

4. Financial Liability of Generators of Hazardous Waste: Generators of hazardous waste using offsite TSD facilities face financial liability for two reasons: (1) the potential of mismanagement of wastes by facility operators, and (2) the possibility of improper design of the facility.

A generator of hazardous waste risks liability when the TSDF owner or operator cannot or will not pay for corrective actions made necessary by the migration of wastes. In these situations, generators of hazardous waste can be held liable under common law for absolute, strict, joint and several liability. Furthermore, under the Comprehensive Environmental Response, Compensation,and Liability Act (CERCLA), Sections 106 and 107, a generator or generators of hazardous waste can be held financially responsible for the entire cleanup or restoration of a facility. Therefore, if less waste is generated, potential liability is reduced, an incentive for both source reduction and onsite recycling.

5. Shortages of Liability Insurance: For many generators of hazardous waste and TSD facility owners and operators, the traditional means for obtaining coverage for potential liability, insurance, is no longer available, or is available only at extremely high costs. In recent years, premiums have increased from 50 to 300 percent, policies have been canceled without cause, and many facilities have problems obtaining coverage at any price. These factors result in higher treatment costs and the loss of available capacity, thus providing yet another incentive for source reduction and onsite recycling.

6. Public Perception of Company Responsibilities: Many companies are initiating waste minimization programs as a

result of public concern over toxic chemicals. This corporate social responsibility tends to produce good relations between industry and the public, greatly increasing the companies perceived public image.

Barriers to Waste Minimization

1. Economic Barriers: While waste minimization usually leads to cost savings, the initial capital outlay needed for plant modernization often is a major obstacle to implementation. This is especially true for medium and small sized companies. Also, firms that may have recently modernized their facilities have a reduced incentive to reinvest in alternative processes.

While financial liability is an incentive, in at least one instance it is a disincentive for waste minimization. Generators of hazardous waste who send waste off-site may be liable under CERCLA and common law for damages resulting from their wastes, even if the wastes have left the plant and are no longer under the firm's control. Therefore they may choose not to use offsite recycling.

2. Technical Barriers: Some firms may be reluctant to make modifications to their production processes for fear of risking the technical quality of their finished product.

There may be other practical limits to waste minimization. Certain products cannot be produced without generating hazardous wastes. Stringent requirements would, in these cases, remove products from the market or force

companies out of business. Therefore across-the-board cuts of fixed percentages of waste generated is not a realistic alternative.

Another technical consideration is that many industries producing high volume or high toxicity wastes often operate largely through batch processes. This presents problems for certain on-site recycling techniques. For example, while light colored off-specification batches of paint can be blended into dark colored batches, the opposite is not always true.

Likewise, process realities and administrative logistics may technically limit off-site recycling. Chemicals such as pesticides and pharmaceuticals that fail to meet specifications have very little recycling potential. Even if wastes are recyclable, it may be difficult to accumulate enough to make recycling feasible. Furthermore, with respect to off-site recycling, stable and permanent relationships may be hard to establish since generators and users of the waste must coordinate processes; purity levels may vary; needed volume levels may not be met; transportation costs may be too high; and price variations in both virgin materials and the end product itself may make recycling uneconomical.

Perhaps the most significant technical barrier may be the hazardous waste generator's lack of engineering information on waste minimization and recycling techniques. This is most often the case with medium and small sized firms.

3. Regulatory Barriers: Some aspects of current environmental regulations tend to discourage waste minimization efforts, such as:

- Source reduction may require the installation of new equipment that may be considered "treatment" under regulations. This would require the generator of hazardous waste to obtain a TSDF permit.
- Commercial recyclers that wish to increase operations, may choose not to if by doing so they will be required to revise their water pollution permit to authorize a change in the composition of their discharges or increase these flows.
- EPA's new definition of solid waste brings some additional wastes into the hazardous waste classification. This seems to prevent some plants from sending these wastes off-site for recycling, since many believe that manifested wastes present greater financial liability for off-site activities not under their control. Also, anxiety over these potential liabilities keeps companies not currently in the hazardous waste system from undertaking any waste minimization program that would require them to accept manifested hazardous waste, such as certain off-site recycling practices, or take other measures that would bring them officially into the hazardous waste management system.

Unfortunately, promoting waste minimization simply as a means to protect the health of the public and the environment is not an adequate incentive for some firms to initiate action. Therefore, efforts must be made to promote the additional advantages of waste minimization to these generators of hazardous waste. Waste minimization is more readily accepted when it is seen as part of a broad picture encompassing not only protection of the environment, but also the improvement, modernization, innovation, and expansion of industrial products and processes. Those who have implemented effective waste minimization programs generally see it as a way to improve profitability and competitiveness.

Table 4

Waste Minimization Project Payback Period [12]

Payback Period (Years)	Total Reported Cases	Percent
< 1	15	54
1 - 2	6	21
2 - 3	2	7
3 - 4	3	11
> 4	2	7
Total	28	100

Source:
Carl H. Fromm, P.E. and David Butler, "Practical Guidelines for Estimating the Profitability of Waste Minimization Measures", Pasadena, California, Jacobs Engineering Group, Inc., 1986, p. 9, Table 4.

Examples show that pollution prevention and waste minimization are relatively profitable for those businesses that undertake the challenge. In a case study that included 115 companies, 28 included data on payback periods (refer to Table 4). More than eighty percent of the 28 companies showed payback periods of less than three years. In addition, capital cost data was included in 22 cases. In three-fourths of these cases expenditures were less than $100,000. Pollution prevention and waste minimization projects may increase profits further if minimization efforts are relatively profitable for those businesses and the resulting waste is marketable, or if various expenses are decreased or eliminated.

CHAPTER 3

CASE STUDIES

Details concerning both the monetary and environmental profits of waste minimization may best be illustrated through an analysis of case studies. Despite the widespread agreement on the desirability of waste minimization, very little has been written about the extent and effects it has had on industry. Therefore, INFORM, Inc., a non-profit research organization that identifies and reports on practical actions for the protection and conservation of natural resources, investigated 29 U.S. organic chemical plants to discover what steps are actually being taken to reduce the hazardous wastes being generated in that industry. The results of INFORM's three year study are entitled Cutting Chemical Wastes.[14]

Unlike many other manufacturing operations whose end products are easily identifiable as consumer goods, the chemical industry's products remain largely unknown to the general public, but are crucial for a multitude of manufacturing processes. However, it is not only their usefulness that makes organic chemicals so important; they also have the potential for being very dangerous. For instance, PCB oil, a suspected carcinogen, has been found in fish in New York's Hudson River, the Great Lakes and elsewhere; ethylene dibromide (EDB), a suspected carcinogen, has appeared in cereals and grains; and dioxin, one of the most toxic industrial wastes known, has been found in schoolyards and front lawns.[6]

Due to this threat, and to the large volume and diversity of hazardous substances the organic chemical industry handles, its waste management practices are of particular concern to all government, environmental and business leaders involved with toxic pollution problems. The more than 1000 organic chemical plants in the U.S. generate over 60 percent of the toxic wastes entering our environment. While the waste reduction practices described in the 29 plant profiles in INFORM's study may not directly represent the waste streams of Riverside County, they do suggest the significant range of opportunities that waste minimization offers.

INFORM states, that the organic chemical industry legally releases millions of pounds per year of hazardous chemicals into the air, water, and land. Air emissions account for close to 100 percent of the discharges of five hazardous chemicals released in amounts of 50 million pounds or more. Organic chemical plants, also, account for 83 percent (112 million pounds per year) of hazardous organic discharges to the nation's waterways, and close to 80 percent (154 million pounds per year) of discharge to municipal sewage treatment plants. In addition, the industry accounts for 11.5 billion (51 percent) of all waste water disposed of by deep well injection. Finally, as for solid wastes, including landfilling, and incineration, the chemical industry as a whole (organic and inorgamic production) account for 68 percent of the 580 billion pounds generated per year in the United States.[14]

INFORM's study reveals some other significant findings. The 29 plants studied generate hazardous chemical wastes in quantities ranging from only 55 pounds to millions of pounds per year. Plants using similar quantities of like hazardous chemicals were found to generate greatly differing quantities of wastes. To illustrate, plants operated by Exxon in Linden, New Jersey, and Rhone-Poulenc in New Brunswick, New Jersey, both handle large quantities of phenol. Exxon used 5.7 million pounds per year and loses 4,430 pounds (0.8 percent) as wastes, while Rhone-Polenc, using 3.5 million pounds, generates over 600,000 pounds of waste (17 percent). Different processes and uses of chemicals at each plant account for some of the observed differences in quantities of waste generated.

With respect to reduction practices, 12 of the 29 plants studied (41 percent) reported a total of 44 waste reduction practices in five categories of source reduction. The five categories identified are process changes, operational changes, equipment changes, chemical substitution and product reformulation. Eighteen of the 44 (41 percent) waste reduction practices involved basic changes to the manufacturing process. Representative examples are: new processes which eliminate the use of mercury and reduce chromium waste generation at CIBA-GEIGY's plant in Toms River, New Jersey; manufacturing processes at the USS Chemicals' plant in Haverhill, Ohio, producing phenol and aniline that both reduced hazardous waste and upgraded a by-

product (diphenylamine) to commercial purity. Monsanto's plant in Addyston, Ohio, has slowly changed its polystyrene process from one of batch reactions to a closed-system, continuous reaction, ultimately reducing air emissions by 99 percent.

INFORM found 14 waste reduction practices at six plants involved operational changes, often overlooked when considering ways to reduce wastes. Even simple changes in the way materials are handled can achieve large reductions in waste generation. Borden, for example, saved rinse-water from tank and filter washings at its Fremont, California, plant for reuse as raw materials, and educated employees on ways to minimize chemical losses. These changes alone resulted in a 93 percent reduction in solid waste generation from the plant's phenol operations and eliminated its reliance on an evaporation pond as a means of treating and storing wastes.

A total of nine equipment changes were used at five of the plants studied to reduce wastes in both process and storage operations. To recover air emissions for use as a raw material, Prestorp installed a bag-house filter on the pentaerythritol processing unit at its Toledo, Ohio, plant and USS Chemical installed a cumene resin adsorption system and a condenser in its Haverhill, Ohio, plant. Both Exxon, in Linden, New Jersey, and USS Chemical, in Haverhill, Ohio, installed floating roofs on their storage tanks resulting in more than a 90 percent reduction in air emissions from these tanks.

The Dow plant in Pittsburg, California, has replaced the use of nitrogen gas to push chemicals from their storage tanks to the reactor vessels with a pumping mechanism, which eliminates the loss of chemicals that previously became mixed with the gas while being transferred.

The study revealed only two examples of chemical substitutions, and only three product reformulations were reported. Union Chemicals' La Mirada, California, plant was the only study plant to substitute a non-hazardous additive chemical for one containing the hazardous metal, mercury. CIBA-GEIGY, at Toms River, New Jersey, reduced wastes by using a higher quality lime in its waste water treatment plant, thus reducing sludge generation. Two instances of product reformulation were: Monsanto's Addyston, Ohio, plant and Stauffer's Richmond, California, plant each modified one of their products to minimize solid waste generation. In a third instance, USS Chemicals (Haverhill, Ohio) was able to upgrade the quality of a hazardous waste by-product, diphenylamine, enabling them to sell it as a commercial product instead.

INFORM's findings show that the specific practices reported were different at each participating plant. Only two plants adopted the same method: Exxon and USS Chemicals both use floating roofs. This diversity of the methods found within the five categories reflects the differences that exist in the industry's operations, products, and processes, suggesting the need to explore site-specific, waste

waste minimization methods. For example, batch-processing plants reduced wastes more frequently through operational changes, whereas continuous-processing plants found equipment changes more effective. For some products, dyes at Atlantic and pharmaceuticals at Merck for example, the need for a high purity level limits the firms' ability to reuse solvents or rinsewaters, forcing the examination of other alternatives.

With respect to the impacts of these waste reduction practices, a total annual reduction in waste generation of seven million pounds was achieved at four plants reporting "pound per year" savings. Five plants reporting economic benefits saved a total of $800,000 annually. Plants operated by Merck in Rahway, New Jersey, and USS Chemicals in Haverhill, Ohio, reported the largest reductions in waste generated with more than three million pounds per year at each plant. Three plants: USS Chemical (Havenhill, Ohio), Exxon (Linden, New Jersey), and Stauffer Chemical (Richmond, California), reported annual cost savings of more than $200,000 each.

Companies reported material savings on a "pound per year" basis for only eight of the 44 practices and annual cost savings for only nine. Therefore, actual material and cost savings were considerably higher than the totals presented in the study.

Although total waste minimization can be measured in the millions of pounds, total hazardous waste generation at the 29 plants amounts to billions of pounds per year.

The largest reported reduction figures of two to three million pounds per year are dwarfed by the largest reported wastestreams: 51.9 million pounds of carbon tetrachloride wastes at Du Pont's Deepwater, New Jersey plant; 17.5 million pounds of chromium wastes at International Flavors and Fragrances' plant in Union Beach, New Jersey; and 15.7 million pounds of phenol wastes at USS Chemicals' Haverhill, Ohio, plant.

While reviewing the results of INFORM's study, an important question that comes to mind is, "Why were so few of these plants initiating waste reduction programs?" In part, the answer may be because only one regulation directly required waste minimization at any of the INFORM study plants. New Jersey's air pollution regulations controlling organic chemical emissions required the Exxon plant in Linden to install floating roofs and conservation vents, both of which reduce wastes at their source. No other plants in the study were directly required by regulation to adopt reduction measures.

The major influences on whether or not a plant initiated waste minimization efforts were: cost factors, liability concerns, public scrutiny and the indirect impact of regulations. Most regulations, rather than requiring waste minimization, simply restrict disposal alternatives or make them more costly. For instance, limitations imposed by sewage treatment plants on Borden in Fremont, California, and Sherwin-Williams in Cincinnati, Ohio, were instrumental

in spurring those plants to adopt waste minimization practices.

Savings in material costs and in the cost of treatment and disposal were frequently cited as incentives for waste minimization. As the cost of cumene, a major raw material at USS Chemical's Haverhill, Ohio, plant increased by six times, the plant found ways to reduce its cumene air emissions by more than a million pounds per year. By replacing leaking pump seals, Stauffer in Richmond, California, prevents the loss of $37,000 per year of raw material costs. In addition, as landfilling costs for Bordon increased from $50 to $150 per cubic yard, the company's Fremont, California plant, found ways to reduce its solid waste generation from its resin operations from 350 to 25 cubic yards per year.

Disincentives: There are several noted disincentives which include regulatory exemptions and loopholes, the availability of low-cost disposal alternatives, and sporadic regulatory oversight. However, many waste management options are in use which are inexpensive, convenient and not strictly regulated, providing attractive means for disposing of, rather than reducing wastes. For example: Wastes can be burned as a supplemental fuel with fewer restrictions than if they were incinerated only to be disposed of as wastes.

Deep well injection of hazardous waste is virtually unrestricted in terms of the types or quantities of chemicals that can be discharged, and it is one of the cheapest means

of disposal. Individual chemical plants can emit hundreds of thousands of pounds of hazardous organic chemicals to the air without violating federal air pollution regulations which currently classify only six chemicals as hazardous air pollutants.

None of the 17 study plants discharging to sewage treatment plants reported that fees were large enough to induce them to search for ways to reduce their wastewater volumes. This sporadic regulatory oversight by federal and state agencies focuses attention on specific chemicals at select plants while virtually ignoring others.

Operating constraints were also cited by six plants as inhibiting waste minimization efforts. Atlantic Industries' Nutley, New Jersey, plant reported that due to fixed costs for air pollution and wastewater control, potential savings from waste reduction are so small they discourage the search for additional measures. Several batch-manufacturing plants, including Atlantic, Merck, and CIBA-GEIGY also reported that while some waste reduction practices had been implemented, the highly variable nature of their operations, along with a need to maintain stringent quality control, minimized the opportunities available.

Despite wide-spread support for waste minimization as the most desirable waste management option, only after regulatory and/or operational pressures forced management to focus on waste minimization and pollution prevention opportunities was it implemented in nine practices at four

plants. For five of the nine cases, once waste minimization was adopted, it was found to be the most economically advantageous choice for waste management. This is an indication of how waste minimization is often the option of last resort, rather than first choice. Exxon's plant did not use floating roofs until they were required by regulations to do so. Borden did not adopt waste reduction practices to minimize resin wastes until regulatory restrictions and problems with the plant's evaporation pond forced them to consider alternatives. In the end, however, both plants found waste minimization to be cost-effective.[14]

CHAPTER 4

PRELIMINARY REVIEW OF RIVERSIDE COUNTY'S WASTE STREAMS

As stated previously, an accurate account of the County's waste stream (A waste stream is any waste that is generated from a maufacturing processes, the County's waste stream is a combination of all waste that is generated), must be developed before we can begin to determine our waste minimization and pollution prevention potential. In an attempt to begin to understand Riverside County's hazardous waste profile, an analysis of the State Department of Health Services hazardous waste manifest list is presented in this section. Much more data needs to be collected and analyzed, however, in order to present the entire "picture".

Table 5 lists the high volume waste streams generated in the County ranked according to tonnage (See Table 5 on page 48). Of the total 11,625.18 tons of wastes manifested in Riverside County in 1988 (.63% of the total for California), the largest category - 2276.62 tons - was waste oil. This figure is not surprising considering that many of the waste generators are small, automotive related facilities.

Another high contributor to Riverside's total output is lime sludge - 1158.7 tons - which is produced entirely by the Stringfellow Treatment Plant. This waste volume is not expected to change much in the near future. In addition, as more contaminated disposal or underground storage sites within the county are mitigated, the volume of contaminated soil is likely to increase. Presently this category ranks sixth in volume at 484.42 tons of total manifested wastes.

TABLE 5

The Fifteen Largest Hazardous Waste Streams

Generated In The County of Riverside*

California Waste Code	# of Facilities	Total Tons
1. 221-Waste Oil & Mixed Oil	53	2276.62
2. 132-Aqueous Solutions with metals	9	1203.45
3. 421-Lime Sludge	1	1158.70
4. 461-Paint Sludge	28	648.74
5. 491-Unspecified Sludge Waste	8	509.37
6. 611-Contaminated Soil	11	484.42
7. 151-Asbestos Containing Waste	9	397.59
8. 121-Alkaline Solution with metals (pH > 12.5)	3	340.33
9. 111-Acid Solution with metals (<2 pH <7)	8	339.59
10. 134-Aqueous Solution with organic residue(< 10%)	5	289.49
11. 214-Unspecified Solvent Mixture	26	284.42
12. 211-Halogenated Solvent	19	282.25
13. 241-Tank bottom wastes	8	252.22
14. 513-Empty Containers < 30 gallons	7	222.72
15. 352-Other Organic Solids	21	194.21
	Total	8884.12

* These 15 waste streams represent 76.42% of total volume reported on manifests originating in the County of Riverside. Waste from "One Time Only", (OTO) manifests are not included in these totals.

The State also provided some projected estimates for hazardous waste facility needs in California for the years 1995 and 2000. Their projection formula was similarly applied to Riverside County's data and is presented in Tables 6 and 7 (see pages 51 and 52). The State figures do not take into account existing or previously proposed facility capacities, and are based solely on manifested wastes shipped to facilities within California.

Wastes managed on-site or wastes otherwise exempt from manifesting requirements are not included. More refined projections should include: existing capacity, additional wastes sources, economic and population growth estimates and the impact of wastes minimization.

The projections were prepared by totaling the State hazardous waste generation totals as reported in the manifest system for 1987 and 1988, and combining them into waste group totals. The group totals for the two years were then averaged. The averages were multiplied by the rates of economic growth from the present to the respective year. Riverside County's 1986 totals for the same waste groups were also multiplied by the same respective rates. The rates are based on personal income in the manufacturing industries, the principle hazardous waste generating industries. The Bureau of Economic Analysis in the U.S. Department of Commerce has published estimates of this measure to the year 2035.[15]

These somewhat crude projections of waste volumes are presented here to illustrate the potential increases in

TABLE 6

Volumes of Waste Generated in Each Group For Riverside County
(Based on 1988 Manifests)
and
For California
(Average for 1987 & 1988 Manifests)

Waste Group	Riverside (1988)	% of Total	California Average	% of Total
WASTE OIL	2,479.37	21.33	377,035.8	20.33
HALOGENATED SOLVENTS	282.18	2.43	19,882.5	1.07
NON-HALOGENATED SOLVENTS	350.01	3.01	112,202.6	6.05
ORGANIC LIQUIDS	568.73	4.89	65,460.3	3.53
PESTICIDES	10.88	.09	21,821.7	1.18
PCBS & DIOXINS	184.33	1.59	26,514.6	1.43
OILY SLUDGES	419.09	3.61	157,127.8	8.47
HALOGENATED ORGANIC SLUDGES & SOLIDS	30.59	.26	5,444.6	.29
NON-HALOGENATED ORGANIC SLUDGES & SOLIDS	405.91	3.49	103,699.4	5.59
DYE & PAINT SLUDGES & RESINS	1,276.37	10.98	33,019.7	1.78
METAL-CONTAINING LIQUIDS	1,887.46	16.23	140,060.0	7.55
CYANIDE & METAL LIQUIDS	0.00	0.00	706.0	.04
NON-METALLIC INORGANIC LIQUIDS & SLUDGES	1,887.46	16.24	268,723.0	14.49
METAL-CONTAINING SLUDGES	59.22	.51	27,702.5	1.49
CONTAMINATED SOIL	609.11	5.24	208,260.5	11.23
MISC WASTES	1,174.88	10.11	287,073.5	15.48
TOTALS	11,625.18	100%	1,854,734.5	100%

Table 7
Projected Waste Generated for Riverside County and California
(Tons/Yr)

Waste Group	Riverside County 1995	California 1995	Riverside County 2000	California 2000
WASTE OIL	3,843.02	584,405.5	4,264.52	648,501.6
HALOGENATED SOLVENTS	437.38	30,817.9	485.35	34,197.9
NON-HALOGENATED SOLVENTS	542.52	173,914.0	602.02	192,988.5
ORGANIC LIQUIDS	881.53	101,463.4	987.22	112,591.6
PESTICIDES	16.86	33,823.6	18.71	37,533.3
PCBS & DIOXINS	285.71	41,097.7	317.05	45,605.1
OILY SLUDGES	649.59	243,548.2	702.83	270,259.8
HALOGENATED ORGANIC SLUDGES & SOLIDS	47.41	8,439.0	52.61	9,364.8
NON-HALOGENATED ORGANIC SLUDGES & SOLIDS	629.16	160,734.0	698.17	178,363.0
DYE & PAINT SLUDGES & RESINS	1,978.37	51,180.6	2,195.36	56,793.9
METAL-CONTAINING LIQUIDS	2,924.93	217,093.0	3,245.73	240,903.4
CYANIDE & METAL LIQUIDS	0.00	1,094.3	0.00	1,214.3
NON-METALLIC INORGANIC LIQUIDS & SLUDGES	2,925.56	331,531.9	3,246.43	367,893.7
METAL-CONTAINING SLUDGES	91.79	42,938.9	101.86	47,648.3
CONTAMINATED SOIL	944.12	322,803.8	1,047.67	358,208.1
MISC WASTES	1,821.06	444.963.5	2,020.79	493,766.4
TOTALS	18,019.01	2,874,838.5	19,995.32	3,190,143.6

hazardous waste volumes if the County chooses not to implement waste minimization efforts.

The hazardous waste generated in Riverside County comes from both large and small businesses. While many of these hazardous waste generators, especially the larger facilities, may have already found alternatives to land disposal for some of their hazardous wastes, it should be apparent that there are still substantial amounts being generated that could be significantly minimized.

PROGRAM ELEMENTS

This section of the report examines those elements or components which, at a minimum, should be incorporated into Riverside County's Waste Reduction Program. The list is by no means complete, and will, in all probability, be expanded once the program is underway. A review of several existing waste minimization and pollution prevention programs throughout the nation, at both the state and local level, suggests the following commonality of program elements:

1. DATA COLLECTION (identifying the kinds of hazardous waste and how much)
2. ESTABLISHING PROGRAM INFORMATION LINKS
3. CENTRAL INFORMATION CLEARINGHOUSE
4. PUBLIC AWARENESS and EDUCATION
5. LOCAL INFORMATION NETWORKS i.e. TRADE and PROFESSIONAL ASSOCIATIONS
6. DIRECT TECHNICAL ASSISTANCE and CONSULTANT SERVICES
7. WASTE STREAM AUDITS (TRAINING and SELF AUDITING PROGRAMS FOR GENERATORS)
8. LOCAL EDUCATIONAL INSTITUTIONS
9. TANNER EFFORTS
10 NEW FACILITY SCREENING
11. FINANCING OF WASTE REDUCTION IMPLEMENTATION FOR HAZARDOUS WASTE GENERATORS

With the exception of element #1, DATA COLLECTION, the elements are not listed in any order of importance. Identifying the kinds and amounts of hazardous waste generated in

Riverside County must, out of necessity, be initiated first in order to give direction to, and establish a gauge for, program success. The remainder of the elements could be implemented concurrently. Some will yield more immediate gains, and information acquired by their implementation will help to realize the success of the others.

DATA COLLECTION

Defining just exactly what it is we are trying to reduce and by what amount we will be attempting to reduce it, is probably the most critical component of the program. However, caution must be emphasized against trying to gather all the data before other program components are implemented. Getting bogged down in an information finding exercise would be devastating to program momentum.

Several data sources are presently available as good starting points, unfortunately none reflect Riverside County's entire waste stream picture. When cross referenced, however, they should help to fill in some of the information gaps. The remainder of the necessary information could be obtained by either a mail-out survey to all permitted generators or by staff field visits to industry. Those information sources presently available include:

A. State Manifest Lists: These lists are published annually by the State Department of Health Services (DOHS) and include specific information on hazardous waste generated in Riverside County, which has been

transported, under manifest, to sites within the State. The manifest list gives a good idea of the general categories and volumes of hazardous wastes being manifested. There is, however, a significant discrepancy between the number of generators of hazardous waste listed on the manifest list (approximately 200) and the number of generators of hazardous waste presently under permit with Riverside County (approximately 1700).

Part of this discrepancy can be accounted for by the fact that many of our permitted facilities are small waste oil generators whose wastes are manifested through a single oil recycling facility.

B. List of Permitted Generators in Riverside County: As stated above, this list includes approximately 1700 generators, large and small, that are presently permitted through Riverside County's Hazardous Materials Management Branch. This is a fairly good source for determining the different types of waste being generated, but information on the amounts of hazardous waste that the generators are producing is sketchy at best.

C. Mail Survey of Generators: One way to obtain information on quantities of waste generated, recycling information, and potentials for waste reduction, would be through a mail survey. A survey form similar to that used by Ventura County (See Figure 2), could be sent to each permitted generator in the County. Assuming a 50-70% response, the information would have value.

Figure 2
Waste Audit Survey Form

Company Name:_____ Chemical Composition of Current
Contact:_____ Wastes:ex:acid etch 10%+water 90%
Phone:_____ _____
Quantity_____ _____

1. Do you recycle or treat any hazardous waste?
   What type:_____
   Quantity/year:_____
2. Has your firm looked for opportunities to:
   ___ Reduce the volume of waste generated per unit of product
   ___ Institute process changes that reduce the volume of toxic chemicals
   ___ Substitute safer chemicals to produce a product with less hazard
   ___ Send waste to offsite facilities for recycling or treatment
   ___ Install recycling or treatment technologies to manage waste onsite
   ___ Other (Please explain)

3. If you are, or plan to, explore some of the above options, what are your major motivations in reducing reliance on land disposal?
   ___ Cost
   ___ Concerns about long term liability
   ___ Concerns that landfills will not be available in the future
   ___ Opportunity to reduce costs by recycling or reclaiming materials
   ___ Pressure from regulatory agency
   ___ Other (Please explain)

4. What action can your company take to reduce/treat or recycle all of your hazardous waste onsite?

5. What treatment or recycling facilities would you like to see operating in Riverside County?

6. What are your future plans to dispose or treat hazardous wastes?

7. What are the barriers (financial, technical, and/or regulatory) that prevent you from treating or reducing your wastes?

8. What services or incentives would help you reduce your waste streams or treat them on-site?

9. Outline Your Companies Waste Reduction Plan

10. Comments or Suggestions

ESTABLISHING PROGRAM INFORMATION LINKS

As the emphasis on waste minimization and pollution prevention as the solution to our hazardous waste management problems continues to grow, available information on the subject is increasing as well. Keeping on top of new reduction technologies and program implementation strategies will be a necessary part of the program plan. Information will be available from many different sources including other local programs, state and federal agencies, and international sources. Information links for receiving and exchanging ideas should be established early in the program development.

LOCAL - At the local level, efforts should be made to exchange new concepts and ideas with other local waste reduction program facilitators throughout the State. Informal meetings at the regional level would be an ideal avenue for new information exchange.

STATE - The State Department of Health Services (DOHS), Alternative Technology and Program Development Section is an excellent source of information. Their ongoing efforts in the area of waste reduction continues to afford information and ideas to local government and generators alike. The information available through DOHS includes, local program develop ment concepts, funding sources for generators, process and equipment technologies, and waste audit studies and applications.

FEDERAL - At the federal level, the EPA has published several documents concerning hazardous waste minimization needs assessment, and has made some specific recommendations on activities which would lay the groundwork for a federal waste minimization program. EPA's recommendations include the following core activities:

- EPA should develop and publish an Agency policy statement on waste minimization including informal guidance to generators concerning what constitutes waste minimization under the reporting a certification requirements of RCRA. To the extent possible, this guidance should be specific to particular industrial sectors and processes.
- EPA should substantially expand its role in providing for technical and informational assistance to generators, including small quantity generators. Because the States have more direct contact with the generators, and hence have more awareness of generators' needs and problems, EPA's primary role should be to support and encourage the States in the development of their programs.
- In the event that mandatory controls are needed in the near term to control the volume or toxicity of wastes generated by particular industries, EPA would use the authority that currently exists under Section six of the Toxic Substance Control Act.

- An appropriate EPA sponsored technical assistance effort could include:

  + Assistance to specific States to initiate and develop programs for providing direct assistance to generators (e.g., using waste audits, dissemination of technical information, applied research on new applications of existing technology). Special attention would be given to the unique needs of small quantity generators.

  + Highlight ongoing research and development and economic feasibility studies that might serve an entire region or have regional application (e.g., central treatment and recovery of electroplating sludges).

  + Development of an information system on waste minimization, accessible by the States, including the following types of information on waste reduction and recycling:

  (a) Technical literature and data on waste minimization organized by waste stream, industrial process, and industrial sector;

  (b) Status and interim or final results of current or planned waste minimization R&D projects carried out under State or Federal auspices;

  (c) Economic data and analyses on technology investment costs and recovery periods.

+ Reciprocally, elements of an expanded EPA supported State technical assistance program are expected to include such elements as:

(a) Technical information resource collection consisting of current literature, newsletters, directories of available recyclers and information hotlines.

(b) Technology transfer programs that directly assist individual generators or selected industry groups with onsite waste minimization audits, onsite needs assessment, and planning and implementation of focused seminar training activities.

(c) Information planning and development activities to fulfill generators' needs for technical analysis, prerequisite for new investments in research and development, or use of alternative technologies.

(d) Administrative support and coordination of State-wide research to identify industries and waste streams creating the largest local hazardous waste problems as well as to identify and analyze economic and institutional barriers to waste minimization innovation.

(e) Administrative support and coordination of State-EPA supported waste minimization demonstrations co-research projects in cooperation with State universities and specific industry groups.

(f) Monitoring and coordination for planning and development of a centralized national information collection and dissemination system.

In order that the technical assistance program can remain a long-term responsive and dynamic aspect of EPA's waste minimization project, the Agency should establish a formal process of coordination with the States to ensure a continuing and responsive technical assistance and outreach effort over the long term.

- In addition, EPA will continue to examine specific elements of the "core" waste minimization program, and make recommendations, if needed, for legislative changes to the existing waste minimization requirements as part of the next RCRA reauthorization. Possible options to consider would be modifications to the existing certification requirements including:
  + Prohibiting, where appropriate, certification of certain types of waste management practices as waste minimization.
  + Providing, where appropriate, formal guidance as to what may be certified as waste minimization. Such guidance could apply generally or to specific industrial sectors.

Flexibility for appeals and exceptions must also be provided. (In any case, where a generator of hazardous waste was not carrying out one of the waste minimization activities that had been listed as certified, the generator could specify an alternative waste minimization activity,

and a rationale for certifying it as waste minimization. Unless the Agency were to place the activity on the list of prescribed practices, it would have to accept the generator's self-certification).

+ Requiring generators who have not undertaken any of the approved waste minimization activities, but who certify that there is no economically practicable alternative to their present waste reduction and management practices, to provide a written justification of such certification.

INTERNATIONAL INFORMATION SOURCES

One good source of international information can be found in scientific journals and periodicals. Many countries throughout the world are beginning to investigate new waste reduction technologies and successful process applications are appearing in the journals. A convenient way to review new international publications is through information service subscriptions such as DIALOG or Japanese Technical Abstracts. Subscriptions to services such as these offer a quick index to the literature of waste reduction technology.

CENTRAL INFORMATION CLEARINGHOUSE

An information clearinghouse should be established within the waste reduction program, to manage all data received through the established information links. A special staff member should be assigned to screen, categorize and

file all newly received information. Categories of importance would include:

1. New reduction equipment and processes including manufacturer's specification literature.
2. Waste reduction articles from periodicals and other technical literature.
3. A listing of waste reduction consultants and their areas of expertise.
4. A listing of successful facility applications with contact names.
5. Recycling information
6. Information on waste reduction financing
7. An index to texts on waste reduction and pollution control which are currently available through university and community libraries.

Data management for the clearinghouse would be facilitated by the use of existing computer capabilities within the Hazardous Materials Branch. Computerizing the information will allow for quick referencing and easy access by the public through a special toll free waste reduction information line.

PUBLIC AWARENESS AND EDUCATION

Once the program framework is in place, and program support has been secured, another challenge lies ahead, selling the program to the public. No matter how well developed the program is, it can never be a success unless it

gains the public's confidence and awareness.

Many medium and smaller sized generators, working with limited capital investment budgets, will be extremely reluctant to invest in any process changes or plant alterations unless they have complete confidence in the advantages of waste reduction. It is therefore extremely important to the early success of the program that we gain industry's faith in our ability to make sensible and technologically intelligent recommendations for reducing waste at their facilities. Staff should continually seek new and innovative ways of keeping the public apprised of the program's activities. Several strategies for promoting public awareness are presented in this section.

Seminars

A series of general waste reduction seminars should be initiated early in the program development. All interested groups including waste generators, waste reduction engineering consultants, equipment manufacturers, and local government policy makers should be invited to participate. Engineers and Hazardous Materials Specialists from the State DOHS are available to lend their expertise and to speak on the current status of the State's Waste Minimization Program. These initial seminars should be general or "whole picture" oriented, and should be followed by smaller waste stream specific workshops.

Workshops

Workshops should be specific in nature and tailored to fit the needs of groups of industries which share similar manufacturing and waste management problems. An attempt should be made to categorize Riverside County's hazardous waste generators into specific workshop groups. The State DOHS has contracted engineering consultants to do onsite waste stream audits for specific types of industries. These consultants should be contracted by the county to speak at the workshops.

In addition, waste reduction staff should investigate the possibility of contracting consultants to study specific industries within Riverside County. The criteria for choosing a particular generator of hazardous waste should include the generator's willingness to implement waste minimization and pollution prevention methods at his facility (including the ability to invest dollars in new process changes and equipment), how much hazardous waste is generated, and how well the facility represents a larger group of hazardous waste generators within the County which could benefit from the waste audit studies. The results of these specific studies should then be presented by the consultant at the waste stream specific workshops.

Newsletters

Riverside County's Hazardous Materials Management Branch presently publishes their Hazardous Materials Review,

which contains legislative updates and information of interest to all hazardous materials handlers in the County. This quarterly newsletter will serve as an excellent vehicle for getting new waste minimization information to generators.

News Media

The news media should be utilized to the fullest extent possible to promote public awareness of the program's waste reduction goals and activities.

- NEWSPAPERS: Articles announcing the program start-up should be published in as many newspapers as possible (both large and small circulation), throughout the County. After the program is underway, those facilities with significant reductions to their waste streams should be spotlighted to demonstrate program effectiveness, and to maintain public awareness.
- RADIO - Staff should take advantage of public service radio announcements when offered.
- TELEVISION - Staff should take advantage of television air time to advertise and promote waste minimization and pollution prevention.

Utility Bills

Some utility companies will allow free public announcements to be included in monthly billing statements. Utility companies are especially receptive to this approach

if it can be demonstrated that the message may help to conserve resources, as would be the case in many waste reduction process applications.

Hazardous Waste Reduction Information Booklet

Waste reduction program staff should develop a booklet which contains preliminary information on setting up an in-plant waste reduction program. Topics of concern in the booklet should include:

1. The necessity of waste reduction now and in the future
2. Case studies of successful reduction applications
3. information on conducting a self-audit of a facility's waste stream with checklists.
4. A guide to "state of the art" reduction processes and equipment.
5. A section on improved in-plant housekeeping procedures
6. A guide to waste recyclers
7. Approximate costs for common implementation strategies and expected payback or recovery costs
8. Information on available financing and funding assistance for implementation costs.

The information booklet should be made available to the plant engineers or managers of every facility generating hazardous waste in Riverside County.

Riverside County Board of Supervisors Recognition

A Board of Supervisors hazardous waste reduction award program should be established so that all participating industries can be recognized. In addition, a special recognition award could be presented annually to one or two facilities which have demonstrated outstanding waste reduction achievements.

LOCAL INFORMATION NETWORKS-TRADE & PROFESSIONAL ASSOCIATIONS

Trade and professional association meetings offer a good arena for imparting industry specific waste reduction ideas and innovations to an audience of like concerns and manufacturing problems. Here again is a good opportunity for consultants working with County staff to increase industry's level of awareness of the program.

> "Industrial trade association meetings involving discussions of waste management issues are important forums for reaching corporate policy-makers and senior engineers. Trade associations and general business associations, such as Chamber of Commerce, often focus on regulatory compliance and cleanup strategies, and provide an opportunity for geographically linked firms to explore mutual reduction and recycling programs. It would make sense for the [County] to assist in the organization of a Speaker's Bureau to take advantage of these and other opportunities to be able to effectively advocate source reduction."14

DIRECT TECHNICAL ASSISTANCE and CONSULTANT SERVICES

Waste reduction program representatives will, in many instances, be advising plant engineers and managers on fairly sophisticated process changes and plant alterations. Existing staff members, although highly competent in areas of

program development, public education, and hazardous materials management, should not be expected (especially at the outset of the program) to be experts in process engineering and waste reduction technology. Most waste reduction programs rely heavily on private consultant services during preliminary program planning and implementation, and then less frequently as staff members achieve higher levels of technical expertise through training and experience.

In many local and state waste minimization and pollution prevention programs, engineering consultants have been used to plan several or all of the program elements including:

1. Preliminary program justification studies and reports.
2. Development of strategies for program implementation
3. Researching the waste streams to determine types and quantities of wastes generated as well as identifying present and future waste reduction potentials.
4. Developing pilot projects for special waste audits on a representative group of industries
5. Direct technical assistance to small or medium sized generators of hazardous waste
6. Training of program staff or facility managers in the techniques of waste audits.

In Riverside County, we are fortunate to have a professional hazardous materials management staff which could

accomplish many of these tasks without private consultant aid (provided that staff resources are available). However, those efforts which do require a high level of industrial expertise should be addressed by the use of private consultants.

One very good review on the subject of waste audits can be found in the City of Los Angeles' publication; Turning Off The Tap: Strategies for Hazardous Waste Minimization in the City of Los Angeles, which states:

> "Direct technical assistance for the waste generating community, by ensuring that waste reduction information and assistance is provided to those who need it, is at the heart of a successful waste reduction effort. The on-site visits, consultations, and audits of individual firms, may be relatively expensive, but as the Ventura County program demonstrates, major reductions can be realized rapidly."[16]

Waste audits are one of the most powerful tools in any waste reduction program. A waste audit, like any form of auditing process, involves the analysis of a particular system using a consistent set of criteria. Generally speaking, a waste audit attempts to give an overall view of a particular firm's manufacturing and management processes. The level of detail can vary considerably, ranging from a review of simple housekeeping measures to sophisticated "mass-balance" analyses in which the entire waste stream, including the volumes of and forms of raw material inputs, are tracked through to the end of the production process in an effort to identify areas of material loss and strategies

for process modifications or material substitutions, or simply improved housekeeping.

Specific and on-site waste audits are important for waste reduction because of the considerable variance between manufacturing processes, even within the same industry. What this means is that there are few entirely successful generic waste reduction techniques, and the degree of variation increases as manufacturing processes become more complex. Audits provide the kinds of information that companies need to evaluate options and to tailor reduction techniques to individual situations.

A waste audit can be performed by in-house personnel, if sufficient expertise is available, by independent consultants, or by trained auditors from public agencies. Although specific criteria and options vary considerably between industries, and even among firms within the same industry, the elements of a waste audit are fairly consistent, and are based upon the criteria used with the highly effective energy audit programs during the 1970s. The audit should provide a review of existing management practices and an analysis of current waste management costs. An accurate understanding of current costs is important to use as a baseline against which to measure future alternatives.

Once the data gathering phase is complete, the task will be to prioritize waste streams according to the costs of management and the associated environmental or safety problems. In other words, a risk and regulatory analysis

is prepared. The end product of the audit is a detailed evaluation of waste minimization options according to the economic feasibility, including cost and potential return on investment, implementation targets, and a framework for establishing waste minimization priorities.

ESTABLISHING A WASTE AUDIT PROGRAM

A Waste Audit Program can be a relatively inexpensive way for a municipality to assist hazardous waste generators in identifying and implementing waste reduction and recycling measures. The components of an audit program would include:

- A series of self-audit manuals for generators in different industries who have a higher level of technical expertise;
- Capability to perform on-site audits by experienced auditors, and to provide written reports covering reduction opportunities;
- Referral to professional consultants for more detailed plant study if the results of the initial audit indicate that a more thorough review may result in additional reduction options;
- Assistance in implementing specific waste reduction options, including assistance in selecting a contractor or equipment vendor for process modifications and new equipment.

COSTS

The costs of performing an environmental audit vary. The cost of an initial in-plant audit has been estimated at $1,000-$2,500, including the preparation of a report. A more detailed plant study could easily cost $7,000 or more per plant, The Department of Health Services reports that recent audit studies of small firms have cost them approximately $5,000 per company. However, a simple audit on a small company would be substantially less, depending upon the use of in-house resources and personnel.

Audits may also be required by financial institutions prior to providing funding for waste reduction, and by insurers prior to providing pollution liability coverage.

SHOULD AUDITS BE MANDATORY?

Recent legislative action, Senate Bill 14 (Roberti), the Hazardous Waste Reduction and Management Review Act, was passed late in 1989. This bill is designated to reduce the generation of hazardous waste and the release of chemical contaminants into the environment. Under this new law, certain industries are required to submit waste reduction evaluation review plans and a schedule that details the implementation of the waste reduction plan.

For those industries that would not be required to file a waste reduction evaluation review plan under the State mandated program would fall under a local plan that would require each generator to submit a simplified waste reduction

form. This waste reduction form would be submitted on an annual basis and would list details of all hazardous wastes that are generated and the steps taken to reduce the amount that is generated. This list would include wastes that are disposed of on-site to air, land, or water; those that are recycled or re-used; and those that are sent off-site for treatment and disposal.

Another approach that could be implemented by the local governmental implementing agency is to negotiate "waste reduction" agreements with those industries that receive permits from governmental departments. This approach has worked in Ventura County.

For instance, the Bureau of Sanitation provides sewer discharge permits to approximately 7,000 of the businesses in the City of Los Angeles. If the Department were to set priorities according to the volume and/or toxicity of a permittee's effluent, "high-priority" facilities could then be examined for waste minimization opportunities.

WHO SHOULD TRAIN AUDITORS?

Potential trainers of auditors include universities, community colleges, industry associations, engineering societies, and private firms. In California, the University of California Extension is a potential candidate for both organizing auditor training programs and for setting up and administering audit programs.

AUDIT STANDARDS

There are presently no audit standards, merely general guidelines. The checklists being developed for specific industries by the Department of Health Services will provide a useful bench-mark for auditing within specific industries.

HOW SHOULD AN AUDIT PROGRAM BE PROMOTED?

By name alone, audits may not carry a positive connotation. But audits can be promoted in several ways:

- Target particular industry group with developed audit formats, such as those from the State DOHS,
- Involve industry trade associations in outreach to business,
- Publicize success stories,
- Emphasize and document benefits (reduced liability, risk, costs, and compliance).

EVALUATION

The purpose of an audit is to ascertain what management or technical changes will reduce hazardous waste generation within an industrial process. The information and analysis provided by an audit will allow an informed choice between options, and allow managers to justify investments which are cost-effective, particularly in instances where a business faces fines, adverse publicity or shutdown. Whenever possible, firms should be re-audited to determine whether changes have resulted in the predicted outcome of decreased

waste generation, and to document the types of changes that have been made, and the amount of reduction achieved.

LOCAL EDUCATIONAL INSTITUTIONS

Local universities and community colleges should not be overlooked as valuable sources of technical and research expertise. Students and faculty with special skills in the areas of Chemistry, Engineering, and Environmental Health should be encouraged to participate in local waste minimization efforts. This kind of government/academic partnership can be mutually rewarding. The waste minimization program gains access to a large source of technical information and research capabilities while the students are challenged to apply their talents toward the solution of "real life" problems; perhaps fulfilling special class project, student internship, or graduate thesis, requirements.

Some examples of special projects which students could get involved with might include doing waste reduction research on a specific waste stream for which no reduction technology presently exists; or working on ways to improve existing manufacturing processes which would yield a lower volume of hazardous waste or wastes with reduced toxicity.

Another project which could prove to be mutually beneficial would be a joint grant proposal. Students and faculty working with waste minimization program staff could pool

their ideas and energy, resulting in more comprehensive grant proposals, which would increase the probability of the proposals being accepted.

Universities may also wish to become involved in the training of waste auditors. The University of California at Riverside already has a Hazardous Materials Management Certification program in place. Broadening that program to include areas of waste minimization, pollution prevention and auditor training, seems like a logical curriculum extension which could be easily facilitated.

TANNER (AB 2948) EFFORTS

With the passage of Assembly Bill 2948 (Tanner), specific responsibilities have been placed on local government for resolving their hazardous waste management problems. The Bill requires local, governments to develop a County Hazardous Waste Management Plan which includes a requirement for, "an analysis of the potential in the county for recycling hazardous waste and for reducing the volume and hazard of hazardous waste at the source of generation."[15]

Given the above, one important component of Riverside County's Hazardous Waste Reduction Program will be to work closely with the Planning Department (lead agency for AB 2948 implementation), as they develop Riverside's CHWMP. Planning members should be able to rely on Waste Reduction Program staff for participation and technical advice in the various ongoing committee meetings.

NEW FACILITY SCREENING

Another important element of a successful waste reduction program includes some mechanism to review new facility plans. As Riverside County's industrial community continues to expand, more and more generators will be contributing to our hazardous waste output. Waste reduction program staff should have an opportunity to plan-check new (or existing facilities undergoing substantial plant alterations), to insure that waste reduction is an integral part of the plant design. Planning or Building department approvals should not be granted until the new facility owner has demonstrated that current waste reduction technologies have been incorporated, where practical, into the facility plans.

FINANCING OF WASTE REDUCTION IMPLEMENTATION FOR GENERATORS

FINANCING FOR LARGER BUSINESSES: Once the decision has been made to pursue waste reduction, large businesses have a variety of options for financing waste reduction efforts including venture capital, equity financing, commercial loans, corporate bonds, and operating budgets. The last, the operating budgets, will be the typical form of financing. Operating budgets will be the primary source of internal funding during the early phases of waste reduction in which a review of waste streams and management procedures will reveal low cost "housekeeping" changes that provide significant reductions prior to the use of more expensive

techniques such as process modification.

FINANCING OF WASTE MINIMIZATION IMPLEMENTATION FOR GENERATORS OF HAZARDOUS WASTE

Larger companies are likely to take advantage of positive economic incentives, such as tax credits and depreciation of capital equipment, as discussed in the next section of this chapter. But for larger companies these incentives are generally considered an added bonus, rather than initial inducement to pursue waste reduction.

FINANCING FOR SMALLER BUSINESSES: Small businesses usually find it far more difficult to fund waste reduction measures. Operating budgets for small businesses often do not allow for expenditures that are not directly tied to near-term production goals. Private sector financing, such as bank loans, can be difficult to obtain for much the same reasons. There are several federal and state financing options, but because of serious drawbacks these options are not widely utilized by small businesses. The probable source of small business financing will be a proposed innovative private sector effort to package private sector financing with government guarantees of repayment.

Financial incentives for private sector waste reduction take two basic forms:

- Positive Incentives includes grant and loans programs, and the use of the tax code using tax credits and accelerated depreciation of equipment, to reduce the overall cost of specific investments. Grants and

loans, on the one hand, and tax inducements on the other, have markedly different effects. Grants and loans are attractive to smaller businesses because they address the need for initial capital. Tax credits and depreciation are of greater benefit to larger companies that can afford to make initial investments from operating budgets.

- Negative Incentives are the mechanisms described above for funding federal, state and local programs, and include feedstock and waste-end taxes, permit and inspection fees and penalties for noncompliance that simultaneously generate government revenue and influence decision-making by raising the cost of "undesirable" activities. For instance, as waste-end taxes increase, so do waste management costs, and this can be a powerful inducement for minimizing the generation of waste.

Because the concern of this section is the financing of waste minimization by small businesses, the following discussion focuses on positive incentives that can decrease the cost at the front-end of the investment.

Federal Loan Programs: The federal Small Business Administration's (SBA's) Pollution Control Facility Payment Guarantee Program has been an intermittent source of financing. SBA guarantees payment of principal and interest on fixed rate loans, obtained from private financial institutions such as banks, that can cover the capital costs

of pollution control or waste management projects, and that can be repaid over a period up to thirty years.

Since 1981, shortly after President Reagan took office, Congress and the Administration have had a continuing battle over retention of the loan guarantee programs. The Administration has repeatedly sought to remove the financing guarantee for small businesses, and the Small Business Administration itself has proposed regulations that would limit the value of the guarantees. Congress has supported retention of the program. The continued uncertainty over the availability of the guarantee has made financing difficult. Loan guarantees, which can take six months to process, have been surrounded by uncertainty and many professionals in the financial community have spent more of this time urging retention of the program than actually processing forms with the federal guarantee.

- SBA financing is available only for the purchase and installation of capital equipment. The result is that only certain equipment-intensive aspects of waste reduction are eligible for funding, such as the purchase of on-site recycling or process modification equipment. This emphasis on capital investment forecloses funding for other stages of waste reduction such as preliminary audits or the development of an ongoing hazardous material use and waste generation tracking system.

But SBA financing, even when available, has several drawbacks that limit its usefulness:

- A small business applicant must be able to demonstrate profitable performance over three of the previous five years. This provision limits SBA funding to established and more profitable companies. Many small businesses that are considered to be successful cannot meet this profitability criterion.
- Loans must be for projects that are necessary for pollution control. The intention of this provision is to ensure that subsidized financing is not used for profit-making investments that might be made regardless of regulatory requirements. But this provision also limits the usefullness of the SBA guarantee because many waste reduction investments will be found to be directly profitable, resulting in reduced production costs over time.
- A substantial loan processing fee and administrative delay in obtaining approval for use of the guarantee can be deterrents for a small business.

In summary, the SBA program is most useful for established, profitable small businesses that need to install pollution control equipment. The program is still geared to the hardware emphasis of early environmental legislation, such as the Clean Water Act that focuses on end-of-pipe solutions rather than on the broad range of preventive measures that comprise waste minimization. It is unfortunate

that the federal program is not more flexible to the needs of small business.

State Funding Programs: The California Pollution Control Financing Authority (CPCFA) is an independent state agency established in 1973 to issue tax-exempt revenue bonds to finance investments in equipment required to meet regulatory standards for air and water quality. The bonds are sold at an attractive rate because they carry the high credit rating of the State of California. Hazardous waste equipment can be financed, but only as its primary purpose is to decrease water pollution.

Major California businesses have been the primary recipients of the bond revenues. Since the late 1970's, however, the CPCFA has "grouped" several bonds composed of ten to twenty small business loans for sale on the bond market. Totaling several million dollars each, these grouped offerings for traditional pollution control equipment purchases take advantage of economies of scale by spreading the administrative costs of putting together and selling the bonds among a number of participants.

But the CPCFA uses the federal SBA loan guarantee program described above to ascertain the credit worthiness of small business applicants. Thus, many of the shortcomings of the federal program are also true of the CPCFA program. There is a loan processing fee that substantially increases the cost of a loan. In short, although CPCFA financing is somewhat more flexible than the SBA guarantees regarding the

investments for which the monies may be used, small businesses find the program to be of limited use.

Attempting to address the problem of capital access for smaller businesses, 1985 legislation by Senator Garamendi, SB 59, established the Hazardous Waste Reduction Incentive Account. The purpose of the Account is to allow the CPCFA to assist small businesses to obtain alternative private sector financing through a variety of means such as lowering the effective interest rate of a loan by subsidizing a portion of the interest. The funds in the Account, $2.6 million, have not been used, however. A major problem is that in the absence of the federal SBA guarantee, private sector financing for small business pollution investments, is still widely viewed by the financial community as "nonproductive investments" that make no contributions to profits.

Finally, as discussed earlier, the AB 685 grant program, administered by the State DOHS, provides an annual total of $1 million. But these grants, for which the applicant must provide a portion of matching funds, will only be available annually to a handful of generators. While useful in demonstrating and publicizing the efficiency of waste reduction, the net effect of the grants on reducing waste generation in the City of Los Angeles will be only marginal.

One drawback of the grant program for many potential applicants is that the applicant must share information

about the waste minimization techniques or technologies. Many firms, whether large or small, believe that sharing such information can result in a loss of competitive advantage.

INNOVATIVE FINANCING TECHNIQUES

The private sector has initiated efforts to provide nontraditional hazardous waste management financing for smaller businesses. In the Los Angeles area the Economic Development Commission of Los Angeles County and the Pooled Loan Marketing Corporation (PLMC) are proposing to offer an innovative program combining the resources of the Small Business Administration (SBA), local banks and financial institutions to provide small generators with financial assistance for source reduction. The PLMC, founded by a California municipal securities firm, is a private sector and for-profit institution designed to pool private bank financing to assist small businesses with investments in the hazardous waste field.[15]

In order to circumvent some of the weaknesses of the Federal SBA loan guarantee program discussed above, the Economic Development Corporation proposes to combine the small loans needed by smaller generators into a single submission to PLMC. SBA guarantees will be far easier to obtain for applicants that pool many small businesses, and the credit worthiness of the individual small business participants will not be as closely scrutinized. The PLMC provides long-term fixed rate financing for small business,

purchasing loans once they are secured with the Pollution Control Financing Guarantee of the Small Business Administration. The PLMC is an innovative means to minimize the administrative cost, both financially and in terms of red tape, of obtaining financing. Because projects that "reduce, abate or control pollution" are eligible, the PLMC program has the potential to provide a percentage of the small generators in the City of Los Angeles with funding to reduce waste generation.

While awaiting word on the above proposal, the PLMC is using the Small Business Pollution Debenture Program to assist small businesses needing loans in the $500,000 to $5 million range. The PLMC uses debentures, essentially I.O.U.'s, issued by the companies themselves and that are backed by the general credit of the PLMC. Local banks accept the debentures with the use of the federal guarantee because the credit of the PLMC, rather than the individual small businesses, is used to back the loans.

Waste minimization program staff should take a lead role in this area by becoming familiar with all available loans, grants, or other innovative funding options, and by educating businesses, especially small quantity generators of hazardous waste, as to the availability of, and the procedures for, procuring financing.

CHAPTER 5

ACTIONS TAKEN BY THE COUNTY OF RIVERSIDE TO FORM A POLLUTION PREVENTION AND WASTE MINIMIZATION COMPONENT TO THE HAZARDOUS WASTE MANAGEMENT PLAN

There are several key actions that are essential to the formation of a waste minimization and pollution prevention component to the hazardous waste management plan and include:

- Obtain an endorsement from the County Board of Supervisors by way of formal resolution to establish Hazardous Waste Minimization as a top priority in the County's hazardous waste management policy.
- Developed guidelines and recommended actions for a local pollution prevention and hazardous waste minimization program.
- Participated in the development and integration of a pollution prevention and waste minimization element in the County of Riverside's Hazardous Waste Management Plan (Assembly Bill 2948, Tanner)
- Co-sponsored a waste minimization workshop in cooperation with the University of California Riverside and the California Local Government Commission to inform governments and industry of current technologies and advantages of pollution prevention and waste minimization.
- Obtained Board of Supervisor approval for funding in the form of a Waste Disposal Gate Fee increase to begin implementation of a local pollution prevention and waste minimization program. (County of Riverside Board of

Supervisors Resolution 86-537).

- Entered into a joint agreement with the University of California Riverside and the County of San Bernardino to apply for a State Department of Health Services Grant. The purpose of the grant is to develop a training program for government agency inspectors in the area of pollution prevention and waste minimization. This grant proposal was approved for Fiscal Year 1989/1990.
- Established an integrated data management system that allows for the dissemination of information that will assist government agencies and industry to gauge the amount of pollution prevention and waste minimization that is attainable within the County of Riverside.
- Developed a library of case histories and literature that promote pollution prevention and waste minimization.
- Developed a computer data base that Catalogues information on consultants, technologies, processes and equipment that can be used as an aid in matching industries with available pollution prevention and waste minimization technologies.
- Developed waste minimization pamphlets which introduce pollution prevention and waste minimization concepts to specific industry types (Automotive Repair, Dry Cleaning, and Printing Industries).
- Established program information links with State Department of Health Services, Toxic Substance Control Program-Alternative Technology Division, other state

agencies, Environmental Protection Agency, and other regional programs.

RECOMMENDED ACTIONS

The County of Riverside should continue to work toward providing innovative approaches to pollution prevention and waste minimization by the following actions:

- Compile a list of recyclable and recoverable wastes, using the State Hazardous Exchange as a starting point. It may also be useful to identify those wastes which cannot be significantly reduced and/or treated.
- Promote State/County sponsored seminars in conjunction with University of California and/or other local colleges to discuss:
  * waste reduction overview
  * new regulations
  * incentives for waste reduction
  * available funding for implementation costs
  * cost saving benefits of waste reduction
  * manufacturer's equipment displays
- Publicize hazardous pollution prevention and waste minimization efforts by:
  * periodic newspaper articles which spotlight the achievements of specific industries.
  * Seek County Board of Supervisors waste reduction awards for all industry participants that demonstrate pollution prevention and wasteminimization.

- Promote pollution prevention and waste minimization at professional and trade association meetings.
- Use the Hazardous Materials Review (County of Riverside's Hazardous Materials Branch newsletter) to provide updated information on waste reduction to County generators.
- Develop an information booklet on waste reduction to be distributed to all County industries.
- Consult with industrial and process engineers in an attempt to target those industries within the County which have the greatest potential for waste reduction, and to attempt to set measurable goals for annual and long-term reduction.
- Investigate the possibility of training existing staff to perform waste audit inspections, and to provide technical assistance when applicable, during routine generator inspections.
- Set up a land use section or have input into the existing planning process, to require new or substantially expanded businesses, both public and private, to submit a pollution prevention and/or a waste minimization plan for approval prior to issuance of any operating permits.
- Take a lead role in overcoming regulatory barriers that may discourage pollution prevention and waste minimization options of small quantity generators.

MODEL RESOLUTION

In the matter of establishing Pollution Prevention and Waste Minimization as a Priority in the Use and Management of Hazardous Materials in the County of Riverside.

WHEREAS the presence of hazardous substances and hazardous waste in the County of Riverside creates a potential threat to public health and safety; and

WHEREAS there are cost-effective practices and technologies now readily available by which to significantly reduce the amount and toxicity of hazardous materials initially used as well as imposed on society's waste management capabilities; and

WHEREAS waste/source reduction benefits chemical users by reducing waste disposal fees and long term liability, as well as the costs of chemical feedstock materials; and

WHEREAS there is a trend in state and federal law away from disposing of hazardous wastes in landfills, creating a serious need for alternatives; and

WHEREAS with the passage of AB 2948, all cities and counties will be authorized to adopt plans for the management and ultimate disposition of all hazardous wastes generated within their boundaries,

NOW THEREFORE BE IT RESOLVED that it is the policy of the County of Riverside to encourage and promote practices and technologies that will, in order of priority:

* First, reduce the use of hazardous substances and the generation of hazardous wastes at their source:

* Second, recover and recycle the remaining wastes for reuse.

* Third, treat those wastes not amenable to source reduction or recycling so that the environment and community health are not threatened by their ultimate release or disposal.

BE IN FURTHER RESOLVED that a copy of this resolution be forwarded to the appropriate entity in charge of implementation of AB 2948 for the County of Riverside. [17]

CHAPTER 6

HOUSEHOLD HAZARDOUS WASTE-ITS ROLE IN TODAY'S SOCIETY

Hazardous materials are synonymous with our modern western lifestyle. Many hazardous materials are designed for the public and are contained in various consumer products in the form of: household cleaning agents, paints, solvents, pesticides, batteries, and automotive fluids.

When hazardous household items become old or no longer have a value to the consumer, they are often discarded in the regular household trash. These items are eventually deposited in the local solid waste landfills which were only designed to store non-hazardous materials.

Household hazardous waste poses short term acute problems for sanitary landfill workers who must process the trash. It also contributes to long term chronic problems at all landfills which include: soil contamination, air pollutants, and groundwater contamination.

As part of the Solid Waste Management Plan for the County of Riverside estimates were made to determine the amount of household hazardous wsate generated within the county's jurisdiction. It is estimated that household hazardous waste composes about 4% of the total hazardous waste generated in the County of Riverside. In 1988 the total amount of household hazardous waste exceeded 1286 tons. In the year 2000, maintaining a conservative 4% growth in household hazardous waste, this will amount to approximately 1932 tons.[18]

Prior to February 1990 the County of Riverside did not have an organized Household Hazardous Waste Community Collection Program. This means that a significant amount of hazardous waste has entered the landfills and polluted the environment. It has been identified and documented by the Regional Water Quality Control Board that most landfills in Southern California have serious groundwater contamination problems.

How will a household hazardous waste collection program help to resolve the contamination problems at the sanitary landfills? First, by initiating a publicity campaign which explains the hazards of household hazardous waste the community becomes more aware of the problem. Second, by providing alternatives to disposal less household hazardous waste gets into the landfill. This is accomplished by providing a special location where the waste can be segregated into like components and then consolidated for recycling. This is the case for water based paints, used motor oil and anti-freeze. The remainder of the household hazardous wastes are "lab packed" for incineration or disposal at special hazardous waste repositories that complies with stringent construction standards and environmental laws.

Why are household hazardous products a problem? In San Bernardino and Riverside Counties almost 80% of all drinking water comes from groundwater. In many areas of the Coachella and Palo Verde Valleys groundwater is at six feet below the surface. These liquefaction zones, in many cases, are highly

contaminated with gasoline, kerosine, solvents and pesticides.

The collection of household hazardous wastes presents a different set of problems than those associated with the collection of industrial wastes. Household hazardous wastes are distributed over the whole population, in very small quantities, making the logistics of collection unmanageable for current commerically operating collection services.

A household hazardous waste community collection program must rely on the public's cooperation to seperate hazardous materials from the normal trash and arrange to take them to a central collection facility. Unfortunately, the public is generally unaware of which common household products are toxic.

In the absense of commerical collection companies, numerous counties and local jurisdictions are beginning to provide the opportunity for citizens to properly dispose of their household hazardous wastes. It must be re-emphasized that to gain public cooperation the lead agency include an aggressive educational program and provide a disposal system that will be convenient for public use.

The County of Riverside Department of Health, Environmental Health Services Division, Hazardous Materials Branch has taken on the task of evaluating options that would provide the best possible service to the citizens of the County of Riverside. The alternatives included:

(See Table 9 for listing hazardous chemicals and potential alternatives to disposal)

Table 9
The Best Way To Handle Common Household Hazardous Wastes 20

PRODUCT	HAZARD	ALTERNATIVE
PESTICIDES, HERBICIDES & FUNGICIDES		
GARDEN SPRAYS ANT AND ROACH KILLERS, WEED KILLERS,	POISON, AND SOME FLAMMABLE	ORGANIC GARDENING, OR ONLY BUY AS MUCH AS YOU WILL NEED FOR USE.
AUTOMOTIVE PRODUCTS		
WASTE OIL, BRAKE AND TRANSMISSION FLUIDS, OLD GAS CAR BATTERIES	FLAMMABLE, CORROSIVE AND POISON	RECYCLE
HOUSEHOLD CLEANERS		
OVEN CLEANERS TOILET BOWL CLEANERS, GLASS CLEANERS, CHLORINE BLEACH, FURNITURE POLISHES	CORROSIVE, IRRATANT, POISON, AND FLAMMABLE	USE UP AS INTENDED, USE ELBOW GREASE WITH MILD DETERGENTS, AND NON-AEROSOLS.
PAINT PRODUCTS		
OIL BASE PAINT & ENAMELS, SOLVENTS THINNERS	FLAMMABLE TOXIC POISON	USE WATER BASED PAINT WHICH SUGGEST SOAP & WATER CLEANUP
MISCELLANEOUS PRODUCTS		
POOL SUPPLIES AEROSOLS ART SUPPLIES	CORROSIVE FLAMMABLE POISON	NONE USE NON-AEROSOL PUMP USE NON-TOXIC WATER BASE

Source:
County of Riverside Department of Health, Environmental Health Services, Information Fact Sheet, Jan. 1990.

Ten Safetyy Tips for Consumers of Household Hazardous Chemicals

1. Keep all toxic and poisonous chemicals out of the reach of pets and children.
2. Always keep these materials in their original container and with their original label.
3. Never put chemicals in jars, bottles or containers which might cause them to be mistaken for food.
4. Never mix materials unless the directions specifically say that you may do so.
5. Always store hazardous materials in a cool dry place (**NEVER NEAR AN OPEN FLAME**).
6. If the container is leaking or deteriorated in any manner, put the container into a large plastic pail and surround the leaking container with sand or kitty litter.
7. Keep all lids to containers tightly sealed.
8. Always follow listed instructions and recommended strength.
9. Only buy what you intend to use right away.
10. Try to use less toxic or non-toxic replacements.

Program Goal

The program goal is to provide the citizens of the County of Riverside a full service Household Hazardous Waste Community Collection Program which will recycle all materials that are ammenable to recycling and find cost effective and environmentally sounds methods of disposal for those

materials that can not be recycled.

Program Objectives

The program objectives have been modified significantly from the invisioned program concept. The revised objectives are listed below:

1. Hire staff and support personnel to provide adequate coverage of the collection center. Staff should include one (1) clerk/typist, two (2) hazardous materials management specialists, and four (4) laborers or lab packing technicians.
2. Select and schedule collection sites. Submit the necessary applications to the Department of Health Services.
3. Train staff in accordance with OSHA 29 CFR 1910 and Department of Health Services requirements.
4. Obtain the necessary equipment and supplies to support the Household Hazardous Waste Community Collection Program.
5. Apply for the necessary variances and permits from the Department of Health Services.
6. Contract with a private hazardous waste hauling and disposal company to properly manifest, transport, and dispose of household hazardous waste.
7. Initiate publicity campaign to advertise program.
8. Develop educational information to be used at presentations and at collection sites that will promote

recycling and provide a forum for critical thinking about the environment.

Program Activities

The program activities that are actively planned include:

1. scheduling of personnel to work at each temporary site throughout the County of Riverside.
that no hazardous waste is entering the non-hazardous
2. Collect household wastes by segregating like materials into Department of Transportation Hazard Classifications.
3. Consolidate those materials that can be recycled: waste oil, anti-freeze, waste paint, and automotive batteries.
4. Lab pack all household hazardous wastes that can not be recycled or reused.
5. properly label and manifest all lab packs for transportation and disposal.
6. Sample and categorize all unknowns using field chemical identification procedure (HAZ-CAT)
7. Maintain accurate records on all materials collected including type, amount, and its ultimate disposition.
8. Make routine inspections of solid waste generated from consolidation of waste oil, antifreeze, and paint to ensure waste landfill.
9. provide community training on household hazardous

waste and environmental topics.

10. provide information and consultation to the public and civic organizations regarding the safe disposal and handling of discarded household hazardous materials.

Program Evaluation

There are several tools that can be used to provide feedback on the usefulness of the Household Hazardous Waste Community Collection Program:

1. Evaluate feedback from survey forms provided to each citizen who utilizes the collection center.
2. Evaluate feedback from media (newspaper, radio, and television.)
3. Request and evaluate feedback from the Hazardous Materials Citizens Advisory Committee.
4. After sufficient time compare with other counties program effectiveness in terms of hazardous waste diverted, participation, and quantities and types of household hazardous wastes collected.
5. Evaluate feedback from landfill personnel to determine effectiveness.
6. Reevaluate program plan based upon results.

Fees/Funding Mechanism

Currently there are no direct fees collected for this program. The County of Riverside Board of Supervisors became aware of the household hazardous waste issue in 1987 and

approved a funding mechanism to initiate the household hazardous waste program. The source of funding was a 10 cent per ton surcharge, "tipping fee", imposed on all haulers of non-hazardous solid waste utilizing the county landfills. The fee was increased to 25 cents per ton in July of 1988 and generated in excess of $380,000.00 in fiscal year 88/89. It is estimated that a fully operational program of the size suggested for the County of Riverside including equipment, personnel, storage, transportation, and disposal will exceed $1 million per year.

Alternative funding to make up the difference could include grants from California's Integrated Solid Waste Management Board (Assembly Bill 939), Department of Health Services Alternative Technology Grant Program, Private Foundation Funding, taxes increases, and/or direct charge to the consumer. The County of Santa Clara currently allows small quantity generators (small industry and businesses) to participate in the household hazardous waste collection program by charging a nominal $10 per gallon fee for disposal.

Program Design

The concept of a mobile household hazardous waste collection program was devised, due in part to monetary constraints and personnel shortages. The creators felt that by providing service similar to what the military refers to as a M.A.S.H. (Mobile Army Surgical Hospital) citizens

throughout the community can be afforded the opportunity to dispose of their household hazardous wastes.

When this concept was brought before the Department of Health Services there was much skepticism and concern. No one at the state level had envisioned this variation of the household hazardous waste collection program. They believed that major problems would surface which would include training of staff, siteing of temporary facilities, abandonment of hazardous waste, and confusion of the public. After 18 months of regulatory bantering and red-tape the final go ahead for a one year variance was granted to operate the mobile household hazardous waste community collection program.

An inital outlay of funds was spent for capital equipment which included:

1. the construction of a special designed storage container which provides secondary containment for accidental spills, explosion proof panel, safety eye wash and shower, placarding, and transportability to temporary sites.
2. the purchase of a pickup truck with a lift-gate to assist in the movement of drums around the site.
3. retrofitting of a van conversion for safety equipment, library, chemical analysis equipment, supplies, and communications (radio and cellular phone).
4. an open purchase order for $20,000 to replace safety items such as gloves, goggles, protective

clothing, and respirators.

5. establishing a service contract with a hazardous waste disposal contractor to provide transportation, storage, disposal, and technical expertise.

6. provide a pleasant working environment. This is difficult because the program is basically done outdoors. However, measures have been taken to provide shade over the working area, equipment to make the job less labor intensive, and adequate breaks to rest personnel.

Program Execution

Each site will be operated with a minimum of one (1) supervising hazardous materials management specialist and five (5) hazardous materials specialists who have been trained in accordance with current safety standards. The household hazardous waste community collection program will operate and accept household hazardous waste a maximum of four (4) hours per day, three (3) days per week. There will be one Saturday collection day where the collection center will be open for a maximum of six (6) hours.

As waste is received from the community each participant will be required to provide the following information:

1. Name
2. Address
3. Telephone Number
4. California Drivers License #
5. Type and amount of hazardous waste being discarded

This information is provided to insure that the waste is being generated from a household and that the participant is a resident of Riverside County. Also, if questions arise as to the contents of an unknown the individual can be contacted to answer questions that might help in the identification process.

After a household hazardous material is accepted it is categorized into a Department of Transportation (DOT) hazard class such as: flammable, corrosive, poison, and/or oxidizer. If a materials lacks labeling information than the materials is categorized based on field chemical analysis procedures outlined in the Hazardous Materials Categorization Field Manual developed by Mr. Robert Turkington.

Materials that can be recycled such as waste oil, paint, anti-freeze, and automotive batteries are consolidated to save money in shipping costs. Pesticides, flammable and combustible liquids, oxidizers are segregated and lab packed into fifty-five gallon steel drums for disposal at a residuals repository that is certified by the Department of Health Services as meeting the requirement as a treatment, storage, and disposal (TSD) facility.

While a drum is in the process of being filled with hazardous chemicals it must be labeled with a hazardous waste label. An inventory of each container placed in that drum must be maintained and certified. The document used for the inventory is called a uniform hazardous waste manifest. The manifest is used by the generator, transporter, and disposal

facility to track when, where, how and by whom the hazardous waste was disposed. Copies of the manifest form are maintained by the generator(County of Riverside Department of Health), the hauler, the temporary storage facility, the disposal facility and the Department of Health Services. As can be seen once the material has been classified as a hazardous waste the material is placed into a "cradle to grave" status, which means that if the disposal facility is found to be unsafe the drums will be removed and the cost for new disposal will fall back to the generator of the hazardous waste.

CHAPTER 7

Educational Component-Environmental Enrichment for Future Generations

The ability to draw upon daily experiences, and pass information on to others, and who can take that information and build upon it, and nurtured it, is how life has endured for eternity. However, if this planet is to survive special information of vital importance must be passed on to future generations or this planet, that we fondly call Earth, will die. It was stated most clearly by Chief Seattle in 1854, "Whatever befalls the earth befalls the sons and daughters of the earth. We do not weave the web of life but are merely a strand in it. Whatever we do to the web we do to ourselves."

There is no magic formula that is required to make changes in the environment it must come from the people, a resolve to make changes that are significant. We did not inherit this world from our ancestors, but are simply borrowing it from our children. Therefore, to help control the degradation of the earth's environmental quality changes must be made in our educational structure that will allow for training of our young people. The lesson to be taught is how to work and live in an environmentally conscious way.

The simplest approach to providing this information is through an aggressive educational component that caters to the specific environmental issues that require our attention. By focusing on the Regional Occupational Program (ROP) of a county school district affords the opportunity of providing first-hand information about hazardous materials management

to individuals who can help make a difference when they go into a job setting.

Lesson Plans

The preparation of a structured lesson plan that can be used as a tool by instructors for the ROP setting must begin with definitions and terms that can be built upon. These definitions and terms can be generalized or specific for a particular job or industrial setting. For clarity definitions and terms specific for hazardous materials in the automotive repair and maintenance field will be the primary topic of discussion.

Lesson Plan 1: Definitions and Terms

California Code of Regulation (CCR): formally known as the California Administrative Code. These are the state regulations. The regulations for hazardous wastes are found in Title 22, Division 4, Chapter 30.

Department of Health Services: The Department at the state level that has the responsibility for toxic substance control.

Disposal: the discharge, deposit, dumping, spilling, leak- ing, or placing of any waste into or on the ground, water, or air.

Environmental Protection Agency (EPA) Identification Number: a number assigned by the Department of health Services or the EPA to each generator, transporter, and treatment, storage, or disposal facility. Example: CAD 123456789.

Generator: not to be confused with an integral part of the electrical system of an automobile. A generator is a business or individual that generates hazardous waste as part of an act or process. In the automotive repair industry the generation of waste oil by an auto repair shop would characterize that business as a generator.

Hazardous Material: a material, which because of its quantity, concentration, or physical, chemical, or infectious characteristic may cause either:

(a) death, serious irreversible, incapacitating reversible illness.

(b) poses a substantial present or potential danger to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hazardous Waste: See "Hazardous Material"

Health and Safety Code: These are the state laws. The Hazardous Waste Control Law is found in Division 20 of the health and Safety Code.

Manifest: the EPA shipping document originated and signed by the generator. the manifest accompanies each shipment of hazardous waste. Copies are kept by the

generator, transporter, disposal facility, and the Department of Health.

Operator: the person or holding company responsible for the overall operation of a business or facility.

Pollution Prevention: preventing hazardous materials from polluting the environment through good housekeeping, product substitution, and recycling.

Recycle: to use, reuse, or reclaim a hazardous waste or a substance from a hazardous waste; this includes recovery of resources from a hazardous waste.

Resource Recovery Facility: Any off-site hazardous waste facility whose primary method of hazardous waste management is the handling, recycling, treatment, use, or reuse of recyclable materials.

Special Waste: any waste which is a hazardous waste only because it contains an inorganic substance which causes it to pose a chronic toxicity hazard to humans or the environment.

Spill: a release of a hazardous material or hazardous waste.

Sudden Accidental Occurrence: an unforeseen and unexpected accident which may result in bodily injury, property damage, or environmental degradation.

Recyclable Material: a hazardous waste that is capable of being recycled.

Retrograde Material: any hazardous waste that is not used, sold, or distributed for use in an originally intended

Treatment: any method, technique, or process which changes the physical, chemical, or biological character, or removes or reduces its harmful properties for any purpose.

Waste Minimization: to reduce the amount of hazardous waste being generated at the source through source reduction, or reduction of toxicity. (See glossary for other definitions)

What should the instructor look for in terms of objectives and outcomes of having students learn definitions? The instructor is building a base upon which the students will be able to understand basic definitions that are used by regulators and generators.

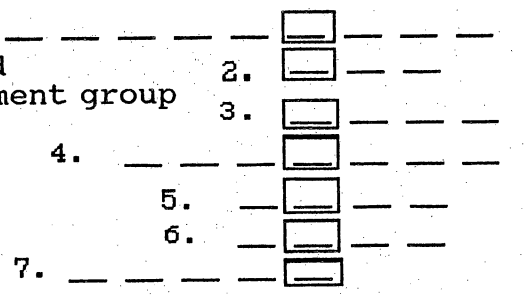
Tools that can be used to facilitate the learning process include puzzle designs like the ones below, quizzes, in class discussions, (See Figures 3,4 &5), and actual usage of terms and definitions in on the job training exercises.

Figure 3
Puzzle Design

What every citizen should stive to achieve is the hidden word in the puzzle below:

Clues:

1. A material that is not being used
2. An abbreviation, federal enforcement group
3. A law or regulation
4. A material that can be reused
5. Hazardous rainfall
6. Cuastic substance
7. Useless, discarded materials



Key 1. Retrograde 2. EPA 3. Code 4. Recycle
5. Acid 6. Base 7. Waste [HIDDEN WORD = Recycle]

Figure 4

SEEK AND FIND THE WORDS THAT PERTAIN TO POLLUTION PREVENTION WASTE MIMINIMIZATION AND HAZARDOUS WASTE

WORDS
BARRELS
CHEMICALS
CONTAMINATED
DANGER
EPA
HAZARDOUS
POLLUTION
RECYCLE
REUSE
SOURCE REDUCTION
TOXIC
WASTE

E	C	N	W	A	S	T	E	S	Q	W	H	R	H	N
B	E	K	L	S	Q	R	M	L	T	E	G	P	S	O
G	A	R	B	G	T	J	U	A	P	E	S	O	P	I
M	T	R	A	R	E	C	Y	C	L	E	X	L	K	T
Z	T	E	R	A	F	Q	G	I	Y	J	O	L	V	C
C	I	X	O	T	E	P	X	M	R	O	P	U	G	U
H	D	E	F	W	L	C	U	E	B	M	B	T	Z	D
A	V	I	X	O	B	H	S	U	H	J	O	I	H	E
Z	T	G	I	R	A	N	U	C	X	L	C	O	E	R
R	T	O	X	E	C	K	P	L	S	R	E	N	S	E
D	G	R	A	G	T	B	O	X	R	W	O	B	K	C
O	A	E	I	G	Y	N	H	E	L	P	M	Y	E	U
U	J	U	D	A	K	W	T	E	J	A	T	V	Y	O
S	C	O	R	D	Q	Z	U	M	U	T	R	E	F	S

Instructions: Find the hidden words in the grid. look for words forwards, backwords, diagonally, up, and down.

Topic: Waste Minimization Terms and Definitions **Grade/Level:** ROP

Specific, detailed and essential learnings	Teacher helps and educational activities	Objectives and outcomes of each essential learning	Materials, sources references, films, handouts, etc, needed to support the essential learnings	Time Needed
1. Terms and definitions	Real world examples and how terms and definitions are used Quizzes and exams	Make students aware of proper terms and definitions regarding waste minimization and pollution prevention	Word puzzles (See Figures 3 & 4), regulations, slides, and films that relate to waste minimization.	Two weeks in conjunction with work study

Figure 5
Lesson Plan Number 1

Lesson Plan 2: Principles of Waste Minimization

The next component in the pollution prevention and waste minimization educational program is an introduction to five (5) basic principles that will make waste minimization happen in the work place. To present this lesson plan it may be best to allow the student to come up with the necessary information and ways to promote waste minimization and pollution prevention in their job training program.

1. **Information:** The need for precise information on the types and volumes of hazardous waste being generated is essential for a successful waste minimization program.

2. **Training and Management:** A commitment by management to provide comprehensive training to both employees and managers on waste minimization and pollution prevention, including incentives which help to promote good waste minimization practices.

3. Good Housekeeping and Maintenance: An essential element in the promotion of waste minimization and pollution prevention is through a rigorous equipment maintenance and inspection program. Maintenance tends to be the one area most often forgotten. However, a routine maintenance and inspection program can be one of the most important aspects of waste minimization. While relatively basic and simple modifications have effected dramatic waste reduction,

emphasis placed on good housekeeping techniques such as inventory control, leak/spill prevention, and waste stream segregation can effectively eliminate most hazardous waste problems.

4. **Design:** Designing basic processes to achieve maximum efficiency as well as focusing on modifications that will effect source reduction will benefit waste minimization and pollution prevention potential.

5. **Planning:** Paramount to waste minimization is the need for flexibilty in planning. As manufacturing increases, so does the necessity for careful planning to ensure that waste minimization efforts keep pace and are incorporated into routine business practices, just as productivity, quality control, and personnel requirements.

To facilitate this learning exercise provide the students with a survey form that they can use in their job training and that will assist them in writing a waste minimization plan (See Figure 6).

Figure 6

Waste Minimization and Pollution Prevention Potential Survey Form

1. What types of hazardous wastes are generated in my job?
2. In what quantities are these hazardous wastes generated?
3. Does management promote waste minimization and pollution

prevention in the work place?

4. Are hazardous wastes being segregated and if so how are they being stored?

5. Are the hazardous wastes being stored recyclable?

6. If the hazardous wastes are recyclable but not being recycled what can be done to ensure that they are recycled?

7. What simple design modifications or process changes could be made so that less hazardous waste is generated?

8. What simple housekeeping techniques could be used to prevent the generation of hazardous waste at the workplace?

9. Is there a routine inspection and maintenance program in place?

The results of the survey and waste minimization plan will give the student the opportunity to see how waste minimization can work (See Figure 7 for Lesson plan #2).

Lesson Plan 3: Why is Waste Minimization a Good Idea?

As well as being the environmentally responsible thing to do, waste minimization and pollution prevention can have a positive financial effect on industry by initializing criteria for the efficient use of valuable resources, as well as, reducing the cost of escalating treatment and disposal fees. Waste minimization will also reduce the financial liability associated with the handling, storage, transportation, and disposal of hazardous waste. Waste minimization

Topic: Principles of Waste Minimization **Grade/Level:** ROP

Specific, detailed and essential learnings	Teacher helps and educational activities	Objectives and outcomes of each essential learning	Materials, sources references, films, handouts, etc, needed to support the essential learnings	Time Needed
Principles of Waste Minimization 1. Information 2. Training Management 3. Good house-keeping & maintenance 4. Design 5. Planning	Pollution Prevention survey report quizzes & exams	Working in an environment that where principles of waste minimization is used. Utilizing tools to encourage waste minimization on the job Realization of Waste minimization potential Survey results and reports on waste minimization	Survey Forms hands-on experiences films and handouts guest speakers	Four weeks

Figure 7
Lesson Plan Number 2

and pollution prevention will help to decrease, or in some eliminate, costly permits and taxes that must be paid by generators of hazardous waste. Concurrently, by taking the initiative to seriously minimize hazardous waste can help to improve relations with the local community. However, like all innovative solutions to the hazardous waste problem, waste minimization will require changes in attitude, creative problem solving, and careful planning to facilitate efforts toward an improved environment.

There are many legal incentives for waste minimization and pollution prevention and including several pieces of legislation at both the federal and state level which mandate waste minimization as the number one priority in the nation. (Resources and Conservation Act as amended by the Federal Hazardous and Solid Waste Management Act of 1984). Further, land disposal restrictions, as well as certification requirements on hazardous waste manifest, specify the implementation of an appropriate waste minimization plan. Other legal incentives from the California Department of Health Services, such as heavy fines and penalties, clearly set as a goal, source reduction, waste minimization, and pollution prevention.

As an assignment, have students interview an industry representative or a government regulator to find out about some of the financial benefits and incentives for waste minimization. Have the students give oral reports on their

findings and how they could help implement valuable waste minimization techniques at their job training site (See figure 8, Lesson plan #3).

By implementing these simple lesson plans into the current curriculum the students will bring waste minimization and pollution prevention concepts to the workplace where they will benefit business and industry, as well as, the environment.

Topic: Why Waste Minimization is a good idea **Grade/Level:** ROP

Specific, detailed and essential learnings	Teacher helps and educational activities	Objectives and outcomes of each essential learning	Materials, sources references, films, handouts, etc, needed to support the essential learnings	Time Needed
Environmental responsibility Efficient use of resources Reduction in cost of TSD fees Drecreased liability Legal incentives	Interviews by students at industrial setting Oral presentations Quizzes and Exams	Give student appreciation for complexity of costs associated with the disposal of hazardous waste	Handouts in-class presentations required reading of pending and current legislation	Four weeks

Figure 8
Lesson Plan Number 3

CHAPTER 8

Concluding Comments

Providing for and ensuring that future generations have an opportunity to live life to its fullest is one of the many reasons why environmental education is important. This paper has served as a conduit for providing information so that the public, school systems, government, and industry as a whole can do their part in pollution prevention and waste minimization. A commitment from everyone is necessary so that we can help heal the planet.

The reality is that environmental problems are not going to go away by themselves. More information and education is needed so that the public can make informed decisions about the environment. Hazardous waste and the issues surrounding it is only a small piece to a complex problem. We as a nation and members of the human race owe it to future generations to help turn the tide on pollution and environmental degradation through comprehensive pollution prevention and waste minimization programs.

GLOSSARY

Glossary

Aa

Abate 1. To reduce in degree or intensity of pollution. 2. to make less in amount. 3. to destroy or end.

Absorption 1. the penetration of one substance into or through another. 2. to take in and not reflect.

ACGIH American Congress of Governmental Industrial Hygienist, a professional organization which recommends exposure limits (TLV's and BEI's) for toxic substances.

Acid A large class of substances that form solutions having a low pH. Stronger acids are corrosive to metals and other materials. Acids may be neutralized by being mixed with bases or alkalis to form salts.

Acid waste A waste with a pH less than 7. An acid waste is considered hazardous when the pH is 2.0 or less.

Activated sludge treatment Exposing wastes to microorganisms and air. A portion of the organic matter is oxidized to carbon dioxide and water and the other portion is synthesized into new microbial cells.

Acute Effects which are manifested soon after exposure to a hazardous material.

Acute Toxicity A poisonous effect produced by a single short-term exposure, that results in severe biological harm or death.

Adsorption The attachment of molecules of a liquid or gaseous substance to the surface of a solid.

Adulterants chemical impurities or substances that by law do not belong in a good, plant, animal, or pesticide formulation.

Aeration To circulate oxygen through a substance, as in waste water treatment where it aids in the purification process.
aerobic life or processes that depend on the presence of oxygen.

Agricultural pollution The liquid or solid wastes from farming, including: runoff from pesticides, fertilizers, and feedlots; erosion and dust from plowing; animal manure, carcasses, crip residue, and debris.

Air curtain A method of containing oil spills, air bubbling from a perforated pipe causes an upward flow of air that slows the spread of oil. It can also be used to keep fish from entering polluted water.

Air pollution The presence of contaminated substances in the air that do not disperse properly and interfere with human health.

Alkaline Waste A waste with a pH between 7 and 14 . A waste is hazardous if it has a pH greater than 12.5.

Aqueous Dissolves in water

Aquifer A geologic formation capable of yielding a significant amount of water to a spring or well.

Asbestos A mineral fiber that can pollute both water and air and cause cancer in the form of mesothelioma if inhaled or ingested.

Bb

Base See "Caustic"

Bioaccumulative A buildup in an organism of toxic chemical from the environment. often due to the solubility of the chemicals in the fat tissue.

Bioassay Using living animals to measure the toxic effects of a substance, factor, or condition.

Biohazard Those infectious agents that present a risk to the well being of humans.

Biological Oxygen Demand (BOD) The amount, in milligram per liter, of dissolved oxygen required by aerobic bacteria to decompose organic matter in a water solution.

Cc

California Code of Regulations Title 22 of the California Code of Regulations pertains to hazardous waste.

Carcinogen Cancer producing.

Caustic To burn, eat away, or destroy living tissue by chemical action. examples: caustic soda, caustic potash.

Chronic toxicity The ability of a substance or mixture of substances to cause injury, illness, or damage to humans or the environment by prolonged or repeated exposures.

Container Any device that is opened or closed, and portable in which hazardous materials can be stored, handled, treated, transported, recycled or disposed of. Examples: pail, drum, or portable tank.

Corrosive The ability to cause destruction to living tissue or steel surfaces by chemical action.

Dd

Department of Health Services The department at the state level that enforces many of the environmental laws and

regulations in California.

Discharge the accidental or intentional spilling, dumping, leaking or placing of hazardous waste into land, water, or air.

Disposal see "discharge"

Disposal Facility a facility where hazardous waste is intentionally placed.

Ee

Environmental Protection Agency (EPA) The agency at the federal level that enforces laws and regulations that pertain to the environment.

EPA Identification Number A number assigned by the Department of Health Services or the EPA to each generator, transporter, and treatment, storage, or disposal facility,

Extremely Hazardous Waste a substance or combination of substances which, if human exposure should occur, may likely result in death, disabling injury or serious illness.

Ff

Facility a hazardous waste facility.

Flammable Capable of being set afire easily or bursting into

flame spontaneously. Any materials with a flash point below 100 degrees fahrenheit.

Gg

Generator Any person or site, whose act or process generates hazardous waste. example: waste oil and waste solvents generated in an auto repair shop. The owner of the shop would be considered the generator of the hazardous waste.

Groundwater water found below the ground surface.

Hh

Hauler see "transporter"

Hazardous Material A substance or mixture of substances which because of its quantity, concentration, or physical, chemical, or infectious characteristics may either cause:

(a) death, serious irreversible or incapacitating reversible illness; or

(b) pose a substantial present or potential danger to human health or the environment when improperly stored, handled, treated, transported, or disposed of.

Hazardous Waste see "hazardous material"

Ii

Ignitable See "Flammable"

Incinerator An enclosed device using controlled flame

combustion to thermally breakdown hazardous waste. Example: rotary kiln.

Ll

Landfill A disposal facility. Class I landfills are the only landfills designated to except hazardous waste.

Leachate Any liquid that has percolated through or drained from hazardous waste.

Load The amount of waste transported by one truck, railroad car or barge to a hazardous waste facility.

Mm

Manifest The shipping document originated and signed by the generator which contains information regarding the contents and amount of hazardous waste being transported to a disposal facility.

Nn

Non-sudden accidental occurrence An unforeseen accident which takes place over time, involving continuous or repeated exposure and results in bodily injury, property damage, or environmental degradation.

Oo

Operator the person responsible for the overall operation of a business or facility that generates, stores, treats, or

disposes of hazardous waste.

oxidizer the ability to combine with oxygen. oxidizer are dangerous because they help fuel flammables and facilitate combustion.

Pp

Pollution Prevention The prevention of hazardous materials becoming hazardous waste through good housekeeping, product substitution and recycling.

Publicly Owned Treatment Works (POTW) Any device or system used in the treatment of municipal sewage or industrial wastes.

Rr

Reactive having properties of explosivity or chemical activity which can be a hazard to public health or the environment.

Recyclable Having the ability to be recycle or reused

Ss

Sludge any solid or semi-solid or liquid waste generated from a municipal, commercial, or industrial waste water plant exclusive of treated effluent from a wastewater treatment plant.

Source Reduction Any activity that reduces the amount of hazardous waste generated. Not producing the waste in the first place.

Spill A release of hazardous waste.

Tt

Tank A stationary device designed to contain an accumulation of hazardous materials or wastes which provides structural support.

Transporter The movement of hazardous materials or waste by air, rail, highway, or water.

Treatment Any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological composition of any hazardous waste, so as to render such waste non-hazardous or less hazardous, or to reduce the volume.

Vv

Variance A deviation from provisions set forth in the laws and regulations. An exception.

Ww

Waste Minimization Audit A survey conducted by in-plant personnel or consultants which identifies and evaluates

opportunities to reduce the amount of hazardous waste generated in a process or operation.

Water Reactive Having properties, of when contacted with water, reacts violently, generating extreme heat, burns, explodes, or produces an ignitable, toxic, or corrosive mist, vapor, or gas.

APPENDIX

Documents Concerning Hazardous Waste Management in the County of Riverside

Household Hazardous Waste Community Collection Program

County of Riverside Department of Health

Environmental Health Services—Hazardous Materials Management Branch

DECLARATION OF NON-COMMERCIAL HAZARDOUS WASTES

NAME:

ADDRESS:

CITY:

DRIVER'S LICENSE
NUMBER:

I HEREBY DECLARE UNDER PENALTY OF PERJURY THAT THIS MATERIAL IS HOUSEHOLD HAZARDOUS WASTE AND NOT FROM A BUSINESS OR COMMERCIAL OPERATION.

SIGNATURE:
DATE:

****

ESTIMATED QUANTITY OF WASTE:

WASTE TYPE:

COLLECTION CENTER LOCATION:

4065 County Circle Drive • Riverside, CA 92503 • Telephone: (714) 358-5055
Mailing Address: P.O. Box 7600 Riverside, CA 92513-7600

DOH HEH 016 (Rev 1/90)

Household Hazardous Waste Community Collection Program

County of Riverside Department of Health

Environmental Health Services—Hazardous Materials Management Branch

Hazard Categorization Checklist

1. Chemical Description: _____

_____

_____

_____

Ignitability:

Yes	No		DOT Label Required
☐	☐	Combustible	
☐	☐	Flammable	
☐	☐	Flammable Compressed Gas	
☐	☐	Flammable Solid	
☐	☐	Oxidizer (Turns KI - Starch paper Blue/Black)	

Reactivity:

Yes	No		
☐	☐	Unstable undergoes violent change	
☐	☐	Reacts violently with water	(Dangerous when Wet)
☐	☐	Forms potentially explosive mixtures	
☐	☐	Generates toxic gases	
☐	☐	Cyanide bearing waste (IF CYANIDE Test Positive-Poison)	
☐	☐	Sulfide Bearing Waste (IF SULFIDE Test Positive-Poison)	

Corrosivity:

- ☐ Less than 2.0
- ☐ pH 2.0 to 5.0
- ☐ pH 5.1 to 7.9
- ☐ pH 8.0 to 12.4
- ☐ Greater than 12.5

Specialist Name: _____ **Date:** _____

4065 County Circle Drive • Riverside, CA 92503 • Telephone: (714) 358-5055

Mailing Address: P.O. Box 7600 Riverside, CA 92513-7600

DOH HHW013 (Rev. 1/90)

For Further Information Contact

County of Riverside
Department of Health
Environmental Health Services Division
Hazardous Materials Branch
(714) 358-5055

Department of Health Services
Toxic Substance Control Division
Region IV
(213) 590-4868

Alternative Technology Section
(916) 324-1807

Hazardous Waste
Hauler Information
(916) 324-2428

Small Business
Assistance Loans

Southcoast Air Quality
Management District
(818) 571-6852

U.S. Small Business Administration
(213) 894-6852

Hazardous Waste Reduction
Loan Program
(213) 382-4300
(213) 739-2999

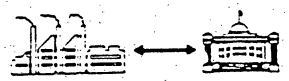
*To help preserve the environment this document was printed on recycled paper.

County of Riverside
Department of Health
Environmental Health Services Division
Hazardous Materials Management Branch
P.O. Box 7600
Riverside, CA 92513-7600

HAZARDOUS WASTE MINIMIZATION

General Guidelines

Responsible Alternatives
for
Improving the Environment



Partnership
between
Industry and Government

- SOURCE REDUCTION
- PROCESS MODIFICATION
- PRODUCT SUBSTITUTION
- RECYCLE AND REUSE

COUNTY OF RIVERSIDE
DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
DIVISION
HAZARDOUS MATERIALS BRANCH
(714) 358-5055

WASTE MINIMIZATION

Waste minimization can be achieved through source reduction, process modification, material substitution, recycling, and reuse. An effective waste minimization program can save money by eliminating those hazardous wastes that need to be treated or disposed, and also, a significant reduction in liability can be realized. Further, it is good business and cost effective to reduce the amount of hazardous waste generated. When you reduce hazardous waste, you help protect the public's health and the environment.

WASTE MINIMIZATION PRACTICES

- Employee training on hazardous materials management and waste minimization.
- Reduce waste by using only the amount of raw materials necessary to do a job.
- Keep your shop clean and orderly. Good housekeeping is important to help eliminate spills and leaks.
- Keep all containers closed to prevent evaporation and to prevent spills.
- Properly label all containers so that materials can be identified.
- Recycle and reuse spent materials whenever feasible.
- Substitute non-hazardous materials for hazardous whenever practical.
- Keep all waste streams segregated to facilitate recycling potential.

Responsible alternatives for improving the environment must include the following general principles:

1. Employee Commitment

The success of a waste minimization program is dependent upon the commitment of all employees from upper management to production worker.

2. Inventory Control

Before starting program planning a detailed materials/waste audit to determine information on materials handling and disposal must be compiled.

3. Program Planning

A comprehensive waste minimization plan outlining realistic goals and objectives should be established.

4. Alternatives

Determine all feasible waste minimization alternatives. Take into consideration facility's size, processes, and waste streams.

5. Evaluation

To ensure effectiveness of a waste minimization program, periodic evaluations should be performed.

ANYTHING YOU CAN DO TO MINIMIZE YOUR HAZARDOUS WASTE STREAM WILL:

Protect The Environment

Save You Money

Reduce Your Liability

and

Help You Comply with The Law

For more information on waste minimization techniques that can help your business

contact

The County of Riverside
Department of Health
Environmental Health Services
Hazardous Materials Branch
P.O. Box 7600
Riverside, California 92513-7600
(714) 358-5055

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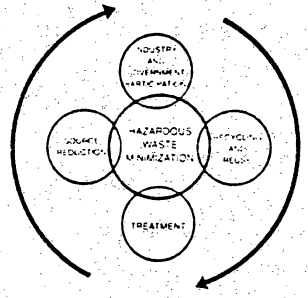
RESPONSIBLE ALTERNATIVES FOR IMPROVING THE ENVIRONMENT



COUNTY OF RIVERSIDE
DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
SERVICES DIVISION
HAZARDOUS MATERIALS BRANCH
4065 County Circle Drive
P.O. Box 7600
Riverside, CA 92513-7600

COUNTY OF RIVERSIDE
DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
HAZARDOUS MATERIALS BRANCH

Waste Minimization Practices

for Automotive Service and Repair Shops

WASTE MINIMIZATION CAN HELP YOUR BUSINESS IN THREE WAYS:

1. Waste Minimization Can Help You Comply with The Law.

Strict laws governing the handling and disposal of hazardous wastes have been enacted by the State of California. Violation of these laws can incur severe penalties and jail terms. Waste minimization can assist your business in complying with these laws.

2. Waste Minimization Can Help You Save Money.

The cost of disposing of hazardous wastes has risen dramatically in recent years. Waste minimization can cut your disposal costs by reducing the amount that needs disposal.

3. Waste Minimization Can Reduce Your Liability.

You may be held liable for any actions or reactions resulting from hazardous waste your business generates from now into the future indefinitely, regardless of who handles it. By minimizing the waste your business generates, you can reduce your potential liability.

Automotive service and repair can produce substantial amounts of waste petroleum products.

The State of California considers waste petroleum products hazardous waste and these wastes must be handled and treated as hazardous wastes.

Petroleum waste products include motor oil, hydraulic fluid, transmission fluid, and grease. Other hazardous waste products your business may generate may include coolants, solvents, batteries and battery acid, asbestos from brake linings, and clarifier sludges from steam cleaners.

Minimize Your Waste Stream

It is important that every businessman understand the importance of minimizing their waste stream.

Land disposal of all hazardous waste will soon be phased out. All wastes must be recycled or treated prior to disposal.

The best way to handle hazardous waste is to not generate the waste in the first place. You can do this by minimizing your waste stream.

YOU CAN MINIMIZE YOUR WASTE STREAM IN THREE WAYS:

1. Good Housekeeping.

Employee Training.

Label Containers Properly.

Secure lids on containers to prevent spills.

Only order and keep on hand materials that you will use.

Keep shop clean.

Drain oil filters - they can then be disposed of as non-hazardous waste.

"RUN A CLEAN SHOP."

2. Material Substitution.

Use only water based pressure steam cleaners with a clarifier. Do not use solvent based cleaning systems.

3. Treatment and Recycling.

Do not mix waste fluids. Many wastes can be recycled. You can improve the recycling potential of these wastes by keeping wastes segregated. Use only one type of solvent, oil, or coolant to improve the recycling potential. Batteries can also be recycled. Check around for a certified battery recycler in your area if you're not already utilizing one.

*** BUDGET LINE ITEM DETAIL ***

FUND ***
DEPARTMENT 47
ORG# ***
NAME ENVIRONMENTAL HEALTH
BRANCH HAZARDOUS MATERIALS MANAGEMENT
PROGRAM WASTE MINIMIZATION AND HOUSEHOLD HAZARDOUS WASTE

COUNTY OF RIVERSIDE DEPARTMENT OF HEALTH

APPR CODE	OBJECT	ACTUAL 1988/1989	CURRENT APPROPS 1989/1990	ESTIMATED EXPENDS 1989/1990	REQUESTED 1990/1991
SALARY AND BENEFITS					
1	10101	$125,883.00	$128,446.00	$128,446.00	$129,008.00
1	10201	$118,922.00	$121,365.00	$121,365.00	$121,971.00
1	10202	$96,974.00	$98,010.00	$98,010.00	$98,500.00
5	10303	$441,615.00	$447,558.00	$348,048.00	$449,865.00
1	20103	$39,050.00	$40,110.00	$40,110.00	$40,310.00
5	60105	$0.00	$0.00	$0.00	$215,830.00
SERVICES AND SUPPLIES					
1	77001	$117,989.00	$50,000.00	$50,000.00	$50,000.00
1	77002	$23,193.00	$0.00	$0.00	$0.00
1	77003	$16,212.00	$5,000.00	$5,000.00	$1,500.00
1	77004	$9,804.00	$3,000.00	$3,000.00	$1,000.00
1	77006	$0.00	$20,000.00	$19,750.00	$40,000.00
1	77008	$0.00	$50,000.00	$50,000.00	$100,000.00
1	77009	$380,000.00	$400,000.00	$400,000.00	$800,000.00
OTHER CHARGES					
1	88001	$15,000.00	$15,000.00	$15,000.00	$15,000.00
1	88002	$0.00	$0.00	$0.00	$7,500.00
1	88003	$0.00	$0.00	$0.00	$19,787.00
APPROPRIATIONS FOR CONTINGENCIES					
1	99001	$10,000.00	$10,000.00	$8,700.00	$10,000.00
1	99002	$10,000.00	$10,000.00	$11,000.00	$10,000.00
TOTAL		$1,404,642.00	$1,398,489.00	$1,298,429.00	$2,110,271.00

* $400,000 SEED MONEY FROM THE COUNTY LANDFILL TIPPING FEE WAS INFUSED INTO THIS PROGR IN 1987 CURRENTLY APPROXIMATELY $40,000 PER MONTH IS PUT INTO A SPECIAL ACCOUNT TO SUPPORT THE ACTIVITIES OF THE HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAM. CURRENT PROJECTIONS BASED UPON ESCALATING DISPOSAL COST SUGGEST THAT AN INCREASE IN TH TIPPING FEE IS REQUIRED TO ADEQUATELY FUND THE PROGRAM.

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